THE ENGINEERING AND MINING JOURNAL.

VOL. XIV.—No. 23.—FOURTH SERIES. NEW YORK, TUESDAY, DECEMBER 3, 1872. PRICE 10 CENTS PER COPY.

The American Institute of Mining Engineers.

PITTSBURGH MEETING.

THIRD SESSION, THURSDAY AFTERNOON, OCT. 17, 1872.

(Continued from Page 338.)

THE PRESIDENT inquired of Mr. ENDRES whether in his opinion the washing of coal has any tendency, by freshening the surfaces, to increase its adhesiveness for coking purposes, and whether he had observed any effect from pressure of gas in coking.

MR. J. J. ENDRES: My experience does not suggest either of these ideas. This is the first time I have heard of coking under pressure. With regard to the exposure of coal, I have noticed that the Pittsburgh coal appears to bear it very well. Doubtless it deteriorates somewhat; but by breaking it we get fresh fractures, and the quality of the coke is good. The Wilmington coal is dryer, I think, than any they call block coal here. The only way to make coke of it is to wash it and crush it fine. I find it makes a difference whether the coal is wet or not. Some coals that scarcely need washing are wet before putting them in the ovens. Washing is necessary for those Ohio coals in which sulphur is diffused.

THE PRESIDENT: Do you think that mixing tar with the coal would improve the coke?

Mr. ENDRES: That has been tried, but with no great success. It has never made good coke, so far as I know, where good coke could not be made without it.

Mr. ALEXANDER: Have you ever tried mixing a rich, fatty coal with a leaner coal; and would it do, in your apparatus, to mix two kinds of crushed coal —say, block coal and some inferior, but bituminous coal?

Mr. ENDRES: I have seen coals mixed together, but they were not found to cement readily. If they are to be mixed, the better way would be to crush them together.

Mr. ALEXANDER: I do not think it particularly important to coke the block coal, because in its natural state it answers every purpose of coke. But there are these coke-coals all through the West, particularly in the vast beds of Indiana and Illinois, which are of little use because they are so sulphury. To cleanse these by washing, and to convert them into a practicable fuel, will be a great benefit to the West.

Mr. ——: I visited a furnace last week where coke made from washed and crushed Ashland coal was used exclusively. They are making 40 tons daily of very good iron, and they informed me that they had used Connellsville coke and Ashland coke, and that they could do better with the latter.

Mr. PECHIN: It is not quite fair to compare Connellsville coke used at a considerable distance from home with coke used where it is made. Transportation always injures it more or less by making much of it too fine. I have seen Connellsville coke badly ground up by a railway journey of two or three hundred miles.

Prof. E. T. COX, State Geologist of Indiana, then made a communication on

THE ANALYSIS OF COAL.

This will be given in full hereafter. It was essentially a detailed description of the methods followed by Prof. Cox in his own practice, for the proximate and ultimate analysis of coal, advanced, as he explained, not as embodying special features of novelty, but as showing, for the benefit of non-professional people, the sources of discrepancies in the results obtained by chemists, and also as a contribution to the important object of securing, after discussion, suggestion, and possible amendment, uniformity of manipulation in coal analysis.

NEW HAND-BORER.

Mr. E. C. PECHIN exhibited and explained a new and convenient form of hand-borer, invented by one of the workmen in the Dunbar mines, and employed in boring the coal. This will be described hereafter in our columns.

FOURTH SESSION, THURSDAY EVENING, OCT. 17.

After the usual preliminary business, the PRESIDENT announced a paper by Prof. T. EGLESTON, on the Theory of Furnaces. This was read by title only, and will be published hereafter.

Mr. A. L. HOLLEY, of Brooklyn, N. Y., then read a paper on

THREE HIGH ROLLS.

In this paper, which was published in our columns, Nov. 5, the American and English methods were compared, and a recent discussion in the British Iron and Steel Institute was reviewed. At its conclusion, a colloquial debate of a desultory character arose. Messrs. PECHIN, MILLER and others alluded to a recent invention, for rolling a rail at one operation, by means of a connected system of rolls. A member remarked that he had seen, some years ago, a system of similar character, and noticed some practical difficulties in its operation. The last pair of rolls was run at very high speed, so that the iron, which came out two feet from the floor, flew some fifty feet before it struck the ground. Yet, even at this rate, the first pair of rolls ran very slow; before the iron got through the seventh pair it was much cooled; and he believed it was as cold at the eighth pair as it was at the sixteenth. Mr. PARK had experimented with the system and abandoned it. He thought there was not much gained in moving a rail horizontally four inches as compared with moving it vertically ten inches, before each successive pass. With regard to the particular invention alluded to, no definite opinion was expressed in the debate, all the speakers protesting ignorance of its details, and disclaiming any favorable or unfavorable application to it of their remarks.

To be Continued.

Hodges Mode of Procuring Peat.

We take from *Engineering* the following account of Mr. HODGES' method of extracting and preparing peat. It is one of the best we have seen, and works on a principle which can be applied to all bogs which contain a great quantity of water. This system is in use at Lapigeonniere Canada.

The fibrous or red peat of Canada is very light when dried, and loses only 40 per cent. in bulk, but from 80 to 90 per cent. of its weight. It is therefore necessary, in order to produce one ton of thoroughly dried peat fuel from an undrained bog, to handle eight or nine tons of stuff; and this necessity of handling so large a weight of material is the greatest difficulty which lies in the way of successful peat fuel manufacture, because, as the heating value of the best peat fuel is only about three-fifths that of coal, there is left but a small margin for profit, which is very easily lost unless the proper means be adopted. And this is the reason who no expensive system of draining the bog, and no artificial means of drying the peat, can be adopted with success.

Mechanical preparation of the peat is necessary, however, apart from the mere work of collection, before an efficient fuel can be obtained, because, although the deposit, which often attains a depth of from thirty to forty feet, may be quite free from earth, sand, or other impurities, it contains roots and branches of trees which must be removed, while the very structure of the material, the small roots, and the innumerable fibres of which it consists, must be cut up and destroyed before it can be converted into fuel; and in order that it should be of a good quality, the disintegration and pulping must be performed before the peat cut from the bog has been exposed for any length of time to the air, or has been partially dried. And this pulping is necessary because peat, not so prepared, but dried simply, always has a tendency to absorb moisture freely, and is of too loose a nature altogether to make a good fuel. On the other hand, the peat taken from the bog, pulped, and allowed to dry by the combined action of the sun and air, forms a dense hard fuel, well suited for combustion under an intense blast.

It is, moreover, a point well worthy of notice, that while the peat, thoroughly dried, but not pulped, freely absorbs moisture, and indeed falls apart when wet, that, manufactured properly, it resists the action of water, as is shown by the fact that samples immersed in water gain only from 3½ to 4 per cent. in their weight. Experience proves, then, conclusively, that to be converted into good fuel, the peat must not only be dried, but that it must be thoroughly broken up and disintegrated immediately it is taken from the bog. It is an important fact, also, that frost has a most injurious action upon the peat when it is only partially dried, destroying its cohesion, and making it always susceptible to moisture. Peat slabs, frozen thus, never become hard, nor will they shrink on subsequent drying; in fact, such peat can only be utilised by being dried, pulverised, and compressed into blocks for domestic use. In the same way the frost affects the peat itself when in the bog, if the natural surface protection of growing moss and other vegetation be removed. Mr. Hodges, whose experience has been a very extended one, states that in October, 1865, he, as an experiment, dug a canal nearly a mile in length, 19ft. wide, and 5 ft. deep, pulped the peat excavated, and deposited it alongside the canal, where it formed an embankment 36 ft. wide, and 2 ft. 6 in. deep. This bank subsided considerably in bulk, until the cold set in, and during the winter the frost penetrated to a depth of 15 inches. The following summer a part of the bank was removed, and while the surface was almost useless, being little better than unpulped

peat, all that lay below the action of the frost was entirely uninjured, and was dried and converted into blocks of first-rate fuel. The embankment formed in this manner was firm and elastic, entirely suitable for a railway formation, but it never became hard, and even during the hottest days of summer it never became dry to a greater depth than half an inch.

As we have said, the comparatively low heating value of peat fuel as compared with coal, and the enormous masses of material that have to be dealt with in the process of manufacture, prevent entirely the application of artificial means of drying; this will be clearly understood when it is considered that the evaporation of 75 tons of water is required to obtain 15 tons of fuel, and the cost of doing this artificially would entirely prevent the process from becoming profitable.

Moreover to attempt the drainage of the great masses of stagnant water, filled with tangled vegetation, which altogether form the peat bog, is always costly, and often attended with extreme difficulty; to make roads over the surface is still more difficult, and hence all the attempts have been unsuccessful in which manufactories have been erected, the bog drained, and roads and tramways laid down, in order that the peat may be collected, conveyed to the factory, cleaned, pressed, and dried. There is not sufficient value in the fuel to pay for any process of this sort, and it is only by s strict adherence to the simplest and cheapest mode of production that it is possible to carry out the work. Such a way Mr. Hodges schemed out some years since, and carried to perfection, and this process we will proceed to describe, premising that a long experience has confirmed all that was done by the inventor several years ago.

We have already described the nature of the peat bogs upon which the process of fuel manufacture has been so successfully introduced by Mr. James Hodges. It remains to describe in some details the nature of the operations and to allude to the results obtained with the manufactured fuel.

Over an extensive undrained bog of considerable depth, a center line, level, of course, is traced out, and on each side of this line, for a distance of about 10 ft., the surface is cleared of the living vegetation, which is piled up on either side, so as to form two low banks of turf and moss, 20 feet apart. Upon one side of this cleared space, it was at first the practice to clear an area some 90 feet in width, for the reception of the peat pulp, but experience showed that it could, without inconvenience, be distributed over the uncleaned bog, excepting that it is necessary to cut down any long lank grass, to draw the roots of trees, and remove stumps, and to level, as far as possible, any irregularities of the surface. Drains from 9 in. to 12 in. deep have, moreover, to be cut at intervals over the surface of the pulp bed, and covered over with turf. On some bogs where the vegetation was very rank, and shrubs grew freely, the surface of the bogs was first stripped, and the turf cut reversed, and laid down again. It was found preferable, however, not to disturb the natural surface, but to cut the drains as just described. The work of removing the roots of trees is not a difficult one, as they take but a comparatively slight hold in the ground, and may be cut away with an axe at some distance from the stem, the tree being pulled down to one side by one man, while a second cuts the roots.

Great care must be taken in clearing the area to be occupied with the future canal, of stumps and roots, and while the surface is stripped to a depth of 6 in. of the upper covering of vegetation, the stunted trees and their roots are also taken away.

At one end of the area thus prepared with the low banks at each side, and 20 ft. apart, a dock is formed, and in it the travelling manufactory is to be launched. It is evident that a convenient site for the construction of this floating workshop must be chosen as a terminal point of the canal, and care must be taken, to ascertain, before operations are commenced, that the bog contains a sufficiency of water to flow in, and fill the excavation as the cutting is advanced. This may be easily found, by making trial borings at intervals along the line of the intended canal. We believe that in one instance only during the whole of Mr. HODGES' experience, a scarcity of water was met with, and in this case the evil was remedied by pumping; but if the flow of water from the sides and bottom of the channel be very deficient, it is obvious that constant pumping from an independent source would be necessary to maintain the water level, and supply the loss from the filtration back into the bog.

The vessels constructed by Mr. HODGES to carry the peat-converting machinery were about 80 ft. long, 16 ft. beam, and 6 ft. deep. A pair of screws with cutting blades, and 11 ft. in diameter, were placed at one end of the boat and driven through gearing by an engine placed in the stern of the vessel. These screws cut their way through the bog, forming a channel 19 ft. wide, and from 4 ft. to 6 ft. deep, and as the water flows in as fast as the peat is taken out, the vessel floats and moves onwards as the screws advance, generally at the rate of about 15 ft. per hour.

The rate of feed given to the screws is variable, and may be increased from 1½ in. per revolution, to 3 in. or 4 in., according to the density of the material through which they have to pass. They are partially enclosed in a shield, through the rear of which a continuous stream of peat passes and is delivered into a well in the bow of the boat. The services of two men are required to clear the peat of any pieces of wood, roots and other useless material which may be fed in by the screws. In some cases it is necessary to clear away the roots, which are occasionally brought up in large masses by the screws, before the peat passes through the shield. From the well, the peat is lifted by an elevator, and discharged into a hopper, and thence into a part of the machinery which arrests such roots, pieces of wood, fibre, &c., which have not been previously removed, after which it is pulped and flows through the distributing trough. The whole of this process is effected without any hand labor, excepting that required for clearing the wood and fibre arrester, and for occasionally adding water to the pulp, if it should not be of a proper consistency.

The distributing trough projects at right angles to the vessel. When required, a second length may be added to the trough, in order that the further end of the pulp bed may be reached, it being necessary to tie back the extended distributor to a light staging on the top of the boat, and to a counter-balance on the other side.

[TO BE CONTINUED.]

Researches on the Consumption of Heat in the Blast-Furnace Process.

BY RICHARD AKERMAN.

Translated by FREDERIC PRIME, Professor of Metallurgy in Lafayette College, Easton, Pa.

CONTINUED FROM PAGE 338.

XXII. With regard to the quantity of heat necessary to warm and fuse the pig iron and cinder, sufficient experiments have not as yet been made to enable us to say with certainty how the charge should be composed so as to attain fusion with the least consumption of heat. Nevertheless it has been ascertained from the experiments made by RINMAN, and in France,* that a much greater amount of heat is necessary to fuse the ordinary blast-furnace cinder, than for an equal weight of pig iron. If, in accordance with the previously stated calculations, it be assumed that the pig iron flowing out of the blast-furnace carries along with it 310 and the cinder 440 cal. per lb. of each, then the cinder must carry out of the furnace 440÷310=1.42 times as much heat as an equal weight of pig iron. Hence it follows that rich charges, or such as give but little cinder per ton of pig iron produced, require in general less coal than charges poor in iron. If the amount of heat necessary for fusion were the only measure for the coal consumption in the blast-furnace process, it is self-evident that the quantity of ore that could be charged with a certain amount of coal would increase in proportion as the charge was richer. But it appears in practice, on the contrary, that on a given burden of coal less of the richer charge, by weight, can be added than of the poorer, the cause of which must be sought in the consumption of coal and heat combined with the reduction of the ores, which shall be fully discussed. In general, therefore, a smaller quantity of rich charges can be charged per ton of coal than of poor ones. Nevertheless, owing to the greater amount of cinder, as well as to its higher specific and fusing-heat, as a rule less coal is consumed per ton of pig iron produced by rich charges than by poor ones. But there is no doubt that the charge should not be made poorer than the controlling conditions, and, above all, the wished for character of the iron to be produced, demands.

XXIII. With regard to the reduction of the silicon and its combination with the pig iron there is first to be remarked that the silicic acid is so difficult to reduce, that the dissociation can only take place in the blast-furnace at the expense of carbon, which is thus oxidised to carbonic oxyd. The quantity of heat thus consumed per weight-unit of pig metal produced is 14.3×4=57.2 cal.* for each per cent. of silicon absorbed by the pig iron, besides which the carbon thus directly consumed, must be added; i. e., 3×12÷48=¾ of the amount of silicon reduced. From which it is apparent that the more siliceous the iron is desired to be so much the more coal and heat must be consumed. It is scarcely necessary to mention that the greater the amount of silicon in the charge, so much the more of it is absorbed by the pig iron.

XXIV. With regard to the reduction of the iron ores it is known that this is accomplished both by the burning of carbonic oxyd to carbonic acid (which produces no change in the heat, as just as much heat is produced as is rendered latent), as well as by the combustion of the coal to carbonic oxyd, by which latter sort of reduction there is a diminution of heat of 2350 cal. (see § 5) per weight-unit of the oxygen withdrawn from the ores. Besides this there is also the noticeable loss of coal of 12÷16 or ¾ of a weight-unit for each weight-unit of oxygen thus removed from the ores. In order to save coal it is therefore of the greatest importance that the arrangements should be of such a character as to reduce as much ore as possible by carbonic oxyd. For this purpose it is necessary that the reduction should be effected so far as possible in the upper portion of the shaft, where the heat has not yet attained to such a degree that the carbonic acid formed by the reduction should be again reduced to carbonic oxyd by contact with the surrounding coal, as otherwise precisely the same condition prevails as in the case where the reduction of the ores takes place by the direct oxidation of the coal to carbonic oxyd. This aim, especially the most perfect reduction in the upper, cooler portion of the shaft, is more fully attained the more readily the ores can be reduced and the more slowly they descend the shaft.

It would lead us beyond the limits of this memoir to go into a critical examination of the reducibility of the various iron ores. But this much may be here

* According to these experiments the cinders flowing from the blast-furnace possess 550 and the pig iron 330 cal., while in this memoir, in accordance with RINMAN'S researches the figures are assumed as 440 cal. for the cinder and 310 cal. for the pig iron. [See DE VATHAIRE, Etudes sur les Hauts Fourneaux, pp. 72 and 76.—F. P.]

* In practice this consumption of heat is somewhat greater since that amount of heat is here omitted which is necessary to decompose the silicate or to separate the silica from the cinder.

stated that, according to the analyses hitherto made of the tunnel-head gases of Swedish furnaces,* it seems that the reduction of the dense magnetites, specular irons and red hematites smelted there, is not completed until they arrive in the immediate neighborhood of the tuyeres, and consequently a certain portion of the coal (7 to 16 per cent. of the amount of coal charged) is required as carbon for reduction. On the other hand, in the case of iron ores which, in consequence of their porosity, are more easily reduced, as, for example, the hydrated peroxyds and carbonates of iron which form the chief ore of many countries, it seems, if the other conditions are properly arranged, that the reduction is completed without requiring a certain portion of the coal for this purpose. Thus BELL (in his previously cited work) has come to the conclusion that in an 80 feet blast-furnace, having about 12,000 feet cubical contents, worked with roasted Cleveland ironstone (carbonate of the protoxyd of iron), no special consumption of coal is necessary for the reduction of the iron ore.

The consumption of coal requisite for the reduction depends not only on the greater or less readiness of reducibility but, as has been mentioned, on the longer or shorter period requisite for the descent of the ores through that portion of the furnace-shaft in which the temperature is sufficient for the reduction by carbonic oxyd, but not high enough to again reduce the carbonic acid in contact with coal to carbonic oxyd. The higher and more spacious the furnace-shaft is, the more extended must the thus formed heated zone be, and therefore the more completely can the ores be reduced before they pass into the hotter, lower portions of the shaft, where the reduction of the carbonic acid commences. The diminution of the coal required for reduction is therefore one of the causes why the consumption of coal is relatively less in large furnaces than in small ones. The further conclusion can also be drawn that the consumption of coal required for reduction will be so much the less, the more the descent of the ores is retarded by a diminution of blast. The fact must not, however, be overlooked that the consumption of coal does not only depend on that portion requisite for reduction, and that by too great a diminution of the blast the temperature of the upper portion of the hearth will soon sink to such a point that a proper fusion will no longer be possible. Hence it is clear that no saving of coal can be accomplished by too great a decrease of the blast; but, on the contrary, that under properly regulated conditions, the least consumption of coal will be with a certain amount of blast (a certain rapidity in the descent of the charges), which last must vary under different circumstances. The separate zones in the shaft must be so regulated with respect to their position and extent, that every noticeable increase or diminution of the blast will be accompanied by an increased consumption of coal, in order to obtain a regular working of the furnace; while an increased amount of blast will prevent the preparation of the ores in the upper zones, and, on the other hand, a decreased quantity of the same will hinder a proper fusion in the lowest zone.

XXV. With regard to the heat necessary for the decomposition of the carbonate of lime, which according to SCHINZ† amounts, per weight unit of this body, to $197.1 \times 56 \div 100 = 110.4$ cal., it is evident that this loss of heat in blast furnaces can be obviated by charging burnt lime. In order to obtain, however, any real advantage from this, it is necessary that the lime-flux should always be at hand in a freshly-burnt state, as otherwise more or less water and carbonic acid are absorbed by the burnt lime. Therefore it can never be known, without constant analyses, how much of such a partially-slacked lime should be weighed for each charge in order to have the wished-for amount of lime in the mixture. This same circumstances should also be regarded in the case of very calcareous iron ores. The more calcareous the ores are, so much the more necessary is it to bear in mind that after calcination they must not remain too long exposed to the air, and above all that they must be protected from moisture. In order to be able to preserve the necessary uniformity in the burden, ores of this kind which have been kept in stock for any length of time after their calcination, should be smelted in not too large quantities with other or recently calcined ores. The air appears to exert no action except in the case of such a powerful calcination that the lime was able to combine with the silica present, or on dead-burnt lime.

In this connection it may be further remarked that the liberation of the carbonic acid from the limestone in the blast-furnace can scarcely be concluded before the latter has reached such a zone of high temperature that a portion of the carbonic acid last expelled must be reduced to carbonic oxyd in contact with coal. In addition to the direct loss of coal thus occasioned (twelve forty-fourths of the amount of carbonic acid reduced), the necessary consequence is a considerable diminution of heat amounting to $(8080 - 2 \times 2473) 12 \div 44 = 854.7$ cal. per weight-unit of the carbonic acid reduced. At first sight it seems as if the loss of fuel thus caused could be avoided if the lime-flux were charged in a calcined condition; but Bell's experiments show that the calcined lime in contact with the furnace gases in the upper portion of the furnace absorbs carbonic acid from these, and as in raw limestone, this is only liberated at a higher temperature. The economy from the use of burnt lime must therefore be very small, if not infinitessimal, and must be confined to the heat necessary to expel the carbonic acid from its combination with lime. The fact that this last portion of heat is actually saved in the blast-furnace, although the burnt lime again unites with carbonic acid in the upper portion of the shaft, becomes evident from the mere consideration that by this combination with the carbonic acid heat is evolved, which is rendered latent by the subsequent dissociation in the lower portions of the shaft. The question whether the lime should be charged in a calcined or raw state is confined to the consideration of how much more cheaply the lime can be burnt outside of the blast furnace than in, which latter is but rarely the case.

In the previous calculations as to the consumption of heat in the blast-furnace, the carbonic acid liberated from the limestone has been assumed to be only present in that condition, while it has here been shown that a portion of it must be reduced to carbonic oxyd. It must, therefore, be here stated that the calculation was so made because it seemed simpler to consider the whole amount as carbonic acid, so long as it was impossible to tell with any degree of certainty how much of this carbonic acid was reduced to oxyd. This simplification of the calculation was the more permissable as no real error thus crept into the heat-calculations. For as soon as the total amount of carbon necessary for all reductions effected in the blast-furnace be assumed as given (in the present case about 12 per cent. of the free carbon present in the fuel), it is of course precisely the same in the consumption of heat whether it be assumed that a portion of the carbon is necessary to reduce the carbonic acid coming from the limestone, while only the remainder is used to reduce a portion of that carbonic acid which is formed by the reduction of the ores; or if, as has been done in the calculations, it be assumed that none of the carbonic acid from the limestone is reduced, and consequently so much a greater portion of the carbonic acid formed from the reduction of the ores be calculated as reduced to carbonic oxyd. The amount of carbonic acid reduced remains the same in either case, and consequently the quantity of heat used in this reduction must remain the same.

(TO BE CONTINUED.)

* See Jern-Kontoret's Annaler for 1865 and Berg und Hüttenmännische Zeitung, 1865.

† See SCHINZ, "Researches on the Action of the Blast-Furnace," London, 1870, p. 53. F. P.

On the Resistance of Various Building Stones to Fire.

BY DR. ADOLPH OTT.

The recent extensive conflagration brings the subject of fire-proof constructions again in the foreground; and although it is well known that the rapid spread of the flames was principally due to narrow streets and high Mansards, it may be of importance to know something definite about the value of building stones when exposed to fire. Two great disasters have taught us the error of the old belief that stones are fire-proof, and materials hitherto supposed to be almost indestructible are now no more considered safe than buildings constructed of the most combustible materials. When we read that, in the Boston fire, "blocks of granite weighing tons were split as if by powder, and hurled across the streets," or that "four-story granite blocks seemed like shavings," and that "marble fronts were burnt off entirely, so as to leave a few chips only," we are amazed and bewildered. Still, such has been the case; and although many of the suggestions now brought before the public may prove valuable, you will all agree that the only remedy against the destruction of cities by fire is to build them with fire-proof materials. If my remarks on the subject may form a guide to those interested in the construction of buildings, I shall feel amply repaid for my labor. It is only since the great fire in Chicago that the attention of the public has been directed to the resistance of building stones when exposed to fire. We possess in an address delivered by Mr. WIGHT before the American Institute of Architects, in the very city whose fate we had to deplore a year ago, an excellent document on the effects of heat on brick and stone. Yet, notwithstanding the valuable information it contains, it leaves us in the dark with regard to many points. It can, for instance, only be of local importance to know that the "Athens stone" was the worst to stand the test of heat, or that the "Cleveland stone" had not been injured at all. We wish to know the cause of these all-important facts. Here mineralogy and chemistry must step in; mineralogy, since it makes us acquainted with the component parts of building materials; and chemistry, since it teaches us at what degree of heat their elements will yield. Let us therefore review the facts brought before us in this light.

It is stated that none of the limestones stood the test of heat, though some were worse, some better. The Illinois limestone "was in very many instances entirely calcined, so that there was scarcely anything remaining of some buildings which were built of brick with stone fronts." With regard to this stone, says Mr. WIGHT, "it was a common thing to explode where the heat came suddenly upon it and was very intense. It seemed to calcine with great rapidity, and I suppose the effect was very much like that seen in the manufacture of pop-corn." At the present moment I am yet unacquainted with any particulars regarding the effect of the late fire upon building stones, but I expect to receive similar information with regard to the various limestones employed in Boston.

These limestones used for building consist essentially of carbonate of lime, or of carbonate of lime and magnesia. These stones, when exposed to a red heat, are decomposed, viz., the carbonic acid is drawn off, while the lime remains in a burnt state; hence they crumble, or are "burnt off" entirely, or are "consumed," as people say.

When heated in places easily accessible to currents of air, the gas is entirely carried off, otherwise a part of the carbonate remains but imperfectly decomposed. Limestones containing magnesia, or, as they are termed, "dolomitic limestones," are still less fit for building materials than ordinary limestones, because magnesia parts with its carbonic acid quite readily at a comparatively low temperature (at about 600° F.), while this same heat leaves the carbonate of lime intact. The knowledge of this fact is all-important to the manufacturer of cement, since,

if burnt at a higher temperature, the product (a mixture of caustic lime and magnesia) is rendered unfit for use.

That the various sandstones used in Chicago have stood the heat best, and that such has probably been the case in Boston, may be concluded *à priori* from their chemical composition. In fact, sandstones are exceedingly well fitted for fire-proof structures. In Chicago, the only building in the burned district on the "south side," says Mr. WIGHT, "which stood intact was of Cleveland sandstone, and in that building there was not a flaw—nothing cracked or broken. In fact, it was not injured at all, except that the solder in the galvanized iron cornice was melted, while the lantern of a lamp-post on the sidewalk was entirely melted, so that pieces of the tin framework hung down like ribbons."

With regard to the predominant ingredient of sandstones, it is quartz, a substance distinguished by its infusibility. Its amount varies from 80 to 97 per cent. The other ingredients are mostly peroxide of iron, alumina, lime and magnesia.

Granite, gneiss, mica-slate and other rocks belonging to the primary formation are generally considered as almost indestructible, yet it is known that they readily crack, and explode, even when only exposed to the radiant heat of neighboring buildings. We are informed that in Boston "blocks of granite composing the walls of the stores already on fire actually began to explode, the fragments being scattered in every direction." This remarkable fact is readily explained, when it is known that granite incloses water. It is well known among quarrymen that the surfaces of fracture in broken granite, syenite, etc., are often found to be more or less moist, and this moisture is found not only as an element in the exterior portions of rocks, but also even in the center of blocks a foot thick, and in masses separated by blasting.

Regarding the artificial Portland cement stone, now coming so largely into use, we possess in it a material in every respect suitable for building purposes. Being a compound of silicate of lime and alumina, with water chemically combined, not mechanically inclosed, it will stand heat almost if not quite as well as sandstone. In respect to the buildings erected in Chicago with artificial stone, we learn from Mr. WIGHT that they were scarcely injured at all. Others say that they stood the test of the great fire better than any other building material in that city. Every stone left standing in the walls, our informant states, was found to be in a perfect condition, and builders have been drawing the blocks away, to be used in the erection of other structures.

In conclusion, a few words about bricks. We know that they do not readily give way under fire; some suppose that as they have been burned, they must be the best material imaginable. Yet these persons forget that bricks are very absorbent and retentive of moisture. True, this moisture may readily escape, but it leaves the bricks porous, and when being over-backed and vitrified, as is often the case, they lose in strength and give way. Were it not for the fact that the walls are generally built uncommonly thin in proportion to their height, and the soft bricks called "fillers" are used to a great extent, the effect of heat on brick walls would be less ruinous than is now the case.

On the use of Calcined Limestone in the Blast Furnace.

BY M. L. GRUNER, ECOLE DES MINES, PARIS.

Translated and condensed for the American Iron and Steel Association, by Thomas M. Drown.

The employment of burnt lime in the blast-furnace in place of raw limestone is not by any means new. As long ago as 1850, calcined limestone was used in some of the furnaces in Upper Silesia, and at the present time, in England, it is used to a limited extent. This practice has, however, never become general, as experience has shown that the saving effected is not always sufficiently great to cover the additional expense of labor and fuel in calcination. But this unfavorable result is due, in part, to the unfavorable conditions under which the experiments have been tried. The necessary conditions for the use of quicklime in the blast-furnace have not been complied with, although these conditions are of the simplest nature, namely: first, cheap calcination, and second, the prevention, as far as possible, of the reabsorption by the lime of carbonic acid and water in the furnace.

The first of these conditions, cheap calcination, is attained by the use of Hoffman's circular kiln, which has been found by experience to answer admirably, not only for the burning of brick, but also for roasting ores and burning lime.

As regards the second condition, the prevention of absorption of carbonic acid and water by the lime, it is self-evident that this result cannot be completely attained; yet we may succeed in lessening the absorption to such an extent that the economic advantage of the use of quicklime shall be materially increased.

Coal consumed in the blast-furnace is oxidized only to carbonic oxide, and gives per kilogramme (2 lbs.) but 2,473 units of heat, while coal consumed in a kiln is oxidized completely to carbonic acid, and gives 8,080 units of heat per kilogramme. A simple calculation based on these figures shows that, for the decomposition of 100 kilogrammes of limestone, 4.96 kilogrammes of coal are needed in a kiln, while 16.27 kilogrammes of coal are required in the blast furnace to accomplish the same result. Assuming, now, that there are used 600 kilogrammes of limestone per ton of pig iron produced, we have a consumption of 29.76 kilogrammes coal in a kiln against 97.62 kilogrammes coal in the furface. But this is not all. The use of raw limestone still further increases the consumption of coal, since a part of the carbonic acid driven off is reduced by the red-hot coal to carbonic oxide. Assuming that only one-fourth* of the carbonic acid evolved from the limestone is thus decomposed, we have an additional consumption of coal of 18 kilogrammes per ton of pig iron. But this decomposition of carbonic acid by carbon is accompanied by a loss of heat, which must be made good by the use of more fuel. This additional amount is equal, on the previous assumption, to 22 kilogrammes per ton of pig iron. We employ thus, altogether, 137.62 kilogrammes of coal in the blast furnace for the decomposition of limestone, when 29.76 kilogrammes would do the same duty in a kiln.

The saving effected by the use of burnt lime ought, therefore, to amount to about 10 per cent. In practice, however, the advantage in its use has been found to be much less. Bell estimates the actual saving at 3.4 per cent., or only one-third of the theoretical amount.

This discrepancy proceeds from two causes: first, from the incomplete burning of the limestone, as ordinarily practiced; and, second, from the presence of carbonic acid and vapor of water in the upper part of the furnace. Quicklime, exposed to an atmosphere of these gases, will, of course, become rapidly converted into hydrate and carbonate of lime, and the work of calcination would, under such circumstances, be speedily undone. If, therefore, we wish to avail ourselves of the full advantage of the use of quicklime, we must strive to reduce the amount of water and carbonic acid in the gases of the furnace to as small an amount as possible, by employing only *thoroughly dry fuel and roasted ores.*

It is, of course, impossible to obviate entirely the formation of carbonate of lime, as all blast furnace gases contain carbonic acid; indeed, we may say that a large amount of carbonic acid in the gases indicates—other things being equal—a good working condition of the furnace; yet we may, to a certain extent, protect the lime, by charging it in large masses, thus exposing relatively less surface, and also by hard burning, so that it becomes partially fritted and less absorbent.

That the use of calcined hydrated and carbonated *ores* has been accompanied by a greater saving of fuel than has been the case with the use of calcined *limestone*, is due entirely to the fact that the former have not, like the latter, a disposition to reabsorb water and carbonic acid.

* Bell asserts that ALL the carbonic acid evolved from the limestone in the blast furnace is reduced to carbonic oxide, a statement which Gruner considers highly improbable.

An Address of the United States Centennial Commission.

To the People of the United States:

The Congress of the United States has enacted that the completion of the one hundredth year of American independence shall be celebrated by an International Exhibition of the arts, manufactures, and products of the soil and mine, to be held at Philadelphia, in 1876, and has appointed a Commission, consisting of representatives from each State and Territory, to conduct the celebration.

Originating under the auspices of the National Legislature, controlled by a National Commission, and designed as it is to "Commemorate the first century of our existence, by an exhibition of the natural resources of the country and their development, and of our progress in those arts which benefit mankind, in comparison with those of older nations," it is to the people at large that the Commission look for the aid which is necessary to make the Centennial Celebration the grandest anniversary the world has ever seen.

That the completion of the first century of our existence should be marked by some imposing demonstration, is, we believe, the patriotic wish of the people of the whole country. The Congress of the United States has wisely decided that the Birth-day of the Great Republic can be most fittingly celebrated by the universal collection and display of all the trophies of its progress. It is designed to bring together, within a building covering fifty acres, not only the varied productions of our mines and of the soil, but types of all the intellectual triumphs of our citizens, specimens of everything that America can furnish, whether from the brains or the hands of her children, and thus make evident to the world the advancement of which a self-governed people is capable.

"In this "Celebration" all nations will be invited to participate; its character being international. Europe will display her arts and manufactures, India her curious fabrics, while newly-opened China and Japan will lay bare the treasures which for centuries their ingenious people have been perfecting. Each land will compete in generous rivalry for the palm of superior excellence.

To this grand gathering every zone will contribute its fruits and cereals. No mineral shall be wanting; for what the East lacks the West will supply. Under one roof will the South display in rich luxuriance her growing cotton, and the North in miniature, the ceaseless machinery of her mills converting that cotton into cloth. Each section of the globe will send its best offerings to this exhibition, and each State of the Union, as a member of one united body politic, will show to her sister States and to the world, how much she can add to the greatness of the nation of which she is a harmonious part.

To make the Centennial Celebration such a success as the patriotism and the pride of every American demands will require the co-operation of the people of the whole country. The United States Centennial Commission has received no Government aid, such as England extended to her World's Fair, and France to her Universal Exposition, yet the labor and responsibility imposed upon the Commission is as great as in either of those undertakings. It is estimated that ten millions of dollars will be required, and this sum Congress has provided shall be raised by stock subscription, and that the people shall have the opportunity of subscribing in proportion to the population of their respective States and Territories.

The Commission looks to the unfailing patriotism of the people of every section, to see that each contributes its share to the expenses, and receives its share of the benefits of an enterprise in which all are deeply interested. It would further earnestly urge the formation in each State and Territory of a centennial organization, which shall in time see that county associations are formed, so that when the nations are gathered together in 1876 each Commonwealth can view with pride the contributions she has made to the national glory.

Confidently relying on the zeal and patriotism ever displayed by our people in every national undertaking, we pledge and prophecy, that the Centennial Celebration will worthily show how greatness, wealth and intelligence, can be fostered by such institutions as those which have for one hundred years blessed the people of the United States.

JOSEPH R. HAWLEY, President.
LEWIS WALN SMITH, Temporary Secretary.

THE COAL TRADE.

NEW YORK, Nov. 28, 1872.

Thanksgiving week is neccessarily a "broken" one, and by consequence a little dull, as the coal that cooked the traditional dinner had long been laid in. The trade in house coals continues active and large sizes are also in what may be considered fair request for the times, as some dealers report a good call for them, while with others the demand is hardly considered dull. The Pennsylvania horses and mules are mostly convalescent, but still weak and the product is still short of what it has been. The remittent character which the desease has shown in the parts of the country first attacked is rather boding for the coal regions, as there may be considerable trouble for some weeks to come. Dealers, however, are not understood to look upon the prospect with any especial gloom.

Prices at the auction sale showed an advance of about 13 cents on stove coal, a falling off of 21 cents on Steamboat, and of 5 cents on Egg; Grate and Chestnut remain unchanged. The exact average had not at last accounts been made up, but the figures above given are very near if not exactly the truth. The range of prices was as follows:

8000 Steamboat	$3 77½	$3 82½
15000 Grate	3 90	3 92½
10000 Egg	4 10	4 12½
30000 Stove	4 70	4 90
12000 Chestnut	3 77½	3 80

The Lehigh Coal Exchange makes no change, its prices being as last month. Lump, $5.00; Broken, $4.75; Egg, $4.75; Stove, $5.10; Chestnut, $4.15. The Delaware and Hudson Company's prices also continue unchanged. As announced a month ago, the price of the Pennsylvania Company advance 10 cents a ton over the rates for the last month

Two circulars are published by the Reading Company as follows:

Circular No. 53.—On and after Monday, December 2d, 1872, the allowance of five per cent. of the weight of anthracite coal transported over the railroads of this Company will be discontinued, and the charges for freight and tolls will therefore be made upon the actual weight of the coal in tons of 2240 pounds. On and after the above-mentioned date, the allowance of ten cents per ton for dumpage at Port Richmond on Anthracite coal will also be discontinued, and a charge of fifty cents per car per day will be made on all cars of Anthracite coal not unloaded on the day of arrival.

Circular No. 54.—A measurement and estimate of all the Anthracite Coal at Port Richmond, at the close of business on the 2d of December, will be made, and, when shipping expenses have been paid by each shipper upon coal, amounting to the tonnage actually on hand on December 2d, no shipping expenses will hereafter be charged on Anthracite coal until further notice. All Pea and Dust coal will be reclaimed by the company and sold for its account.

A number of the transportation undertakings on foot will be of use to the coal interests. One of the principal of these is the opening of the Chesapeake and Ohio Railroad, which is attracting some attention for the reason that it opens to wider usefulness the splint coal of the Kanawha Valley. The Pittsburgh *Commercial* says, of this fuel:

The discovery of splint is not new. This peculiarity of coal on the Kanawha has been known for years. It is a most valuable variety of mineral coal for the manufacture of iron and steel, being nearly free from sulphur, and does not cake in the furnace. It possesses a high percentage of carbon and little ash, and is the only fossil coal that can be successfully employed in the Bessemer process. In a word, it is a complete substitute for vegetable charcoal. In view of the accumulating difficulties to your iron manufactures and coal shippers, why do not some of your large operators go down into Virginia? I have visited the Kanawha coal field, embracing over 8,000 square miles, examined many mines and the quality of coals, and unhesitatingly pronounce that the best field now open to capitalists. It is accessible; the veins above water level; seams from four to ten feet in thickness; and coal of the finest qualities. It is manifest Pittsburg coal interests in the Southwest cannot long be made remunerative. Mr. Walton, in his remarks befor the Cincinnati Coal Exchange, a few days since, states that the Pittsburg shipper paid for coal in the barge, at Pittsburg, about 11 cents per bushel. This statement was made in the face of the offer from Indiana to furnish the city 10,000,000 bushels annually from the Brazil block coal mines at 12 cents per bushel. Supplies from either source —the Monongahela or Wabash—are impracticable, in competition with the mines of West Virginia, on the Kanawha, Coal, Guyandotte, Water Pot, or Sandy. It has been estimated that coal can be furnished at Cincinnati and Louisville from the Kanawha, cheaper than the mineral can be loaded into barges at Pittsburg, and the statement of Mr. Walton confirms the declaration. Why, then, will Pittsburg coal operators permit this fine field to be occupied by other capitalists, thus depriving them of one driving them from the Southwestern trade?

Coal lands of first quality can be purchased on the Kanawha and tributaries at prices varying from $15 to $20 per acre, bearing splint, bituminous and cannel coals. Transportation from the Kanawha is generally from three to five months longer than the Upper Ohio. But, independent of water transportation, a great through line of railway is about to be completed. The Chesapeake and Ohio R. R. is now virtually finished. The last contracts have been completed for grading, bridging, tunnelling, &c. The track is about ready for iron, Soon we shall see this really great enterprise carried through, and the prophetic vision of Washington realized. The road traverses the great Kanawha coal fields from Saull's mountain—the initial point of the vast basin—to the city of Huntington, on the Ohio, nine miles above the mouth of the Big Sandy. Coal can, at all seasons, be carried from Soap Creek, Cabin Creek, Elk, Coal, Mud, Guyandotte, and other important streams, striking the Ohio 355 miles below Pittsburg, beyond all devious navigation; buyers can freight it to Cincinnati in a few hours. By the completion of the Kentucky Shore Railroad, or the Hillsboro route, unbroken transportation by rail can at all times be secured. Coal can now be secured on the Kanawha at $3.50 per hundred bushels. It can be carried to Cincinnati by January, 1873, and sold at from $9 to $10. By increased facilities the cost can be materially diminished. The splint must become a substitute for coke in home manufactures. It can be brought to Pittsburg and sold at a profit in competition with Youghiogheny coke. Coal on the Monongahela and Youghiogheny is too valuable to be charred into coke. It will all be required for domestic uses.

Bituminous Trade.

The demand for coal continues excellent, and prices are high, $5.00 being the price of the Consolidation Company at Baltimore.

Anthracite Coal Trade for 1871 and 1872.

The following table exhibits the quantity of Anthracite Coal passing over the following routes of transportation for the week ending November 23, 1872, compared with the week ending Nov. 25, 1871.

COMPANIES.	1871. WEEK.	1871. TOTAL.	1872. WEEK.	1872. TOTAL.
*Phila & Reading R. Rt.	124,507	5,187,877	123,117	5,339,279
*Schuylkill Canal	27,512	983,552	23,265	819,999
*Lehigh Valley R. R.	61,386	2,176,468	54,481	2,970,189
Lehigh & Sus. R. R.	29,412	1,162,900	27,975	1,576,252
Lehigh Canal	29,39[illegible]	724,330	16,179	753,912
Scranton North	11,845	503,672	15,348	729,013
" South	48,563	1,124,277	17,321	1,867,430
Penn. Coal Co., rail	26,238	689,552	25,936	1,107,851
" " " canal	....	13,962	744	6,241
Del. & Hud. Canal Co.	37,375	991,787	32,878	1,369,093
" " East	8,597	308,525	7,402	501,703
" " West	3,465	103,537	8,761	387,254
" " South	9,956	301,515	5,134	351,448
Shamokin	11,830	584,764	14,428	525,979
Trevorton	....	....	....	....
Lykens Valley Coal Co.	2,080	87,611	..	2,085
Wyoming North	....	....	....	....
Wyoming South	....	....	....	....
P. N. Y. C. & R. R. Co.	....	104,987	7,646	572,739
Williamstown Col'y	....	....	....	....
Big Lick Col	3,585	136,022	....	10,591
Total.	435,747	15,186,338	380,915	18,891,048
1870	380,015			15,186,338
Increase	....			3,704,710
Decrease	55,732			

* These figures are for the week and fiscal period commencing Nov. 30.

† Less coal transported for Company's use and Bituminous coal.

Bituminous Coal Trade, 1871 and 1872.

The following table exhibits the quantity of Bituminous Coal passing over the following routes of Transportation for the week ending Nov. 23, 1872, compared with week ending Nov. 25, 1871.

COMPANIES.	1871. Week.	1871. Year.	1872. Week.	1872. Year.
C. & O. Canal	14,212	643,919	5,282	606,259
B. & O. R. R.	25,585	1,121,848	29,603	1,143,958
Penn. S. Line			2,177	7,598
H. & B. T. R. R.	7,215	292,262	7,248	276,858
*Harrisburg & D.	11,429	503,674	5,355	449,361
*L. V. R. R.	2,031	354,517	475	26,685
P. & N.Y.C. & R. Co.	....	....	4,753	331,414
Cumberl'd Branch Canal	4,873	190,463	3,217	201,085
" Railroad	1,677	64,374	484	20,842
Total	66,918	3,171,047	58,594	3,064,060
	58,594	3,064,060		
Decrease	8,354	106,987		
Increase				

Lehigh Coal and Navigation Company,

Report of Coal transported over the Lehigh Canal and L. & S. Div. of Central Railroad of New Jersey for the week ending Nov. 23, 1872, and for the year 1872.

	WEEK.	YEAR.
Forwarded East of M'ch Chunk by Rail	27,974 15	1,576,251 12
Delivered at and above do., ...	1,662 17	57,218 03
Forwarded East of do., by Canal	16,179 09	753,912 02
	45,817 10	2,387,381 17
Corresponding period last year—		
Forwarded East of M. Chunk by Rail..	29,411 16	1,162,900 06
Delivered at and above do., ..	2,130 17	61,875 12
Forwarded East of do., by Canal	29,396 03	722,330 04
	60,938 16	1,947,106 02
Increase on Railroad	.....	408,693 17
Decrease " "	1,905 01	
Increase on Canal	.....	31,581 18
Decrease " "	13,216 14	
Of the above there was transported on account of—		
Lehigh Coal Nav. Co.	14,431 07	839,853 09
Wilkesbarre Coal & Iron Co.	10,710 08	896,834 14
	25,141 15	1,736,688 03
Corresponding period last year—		
Lehigh Coal & Nav. Co	19,456 18	525,174 19
Wilkesbarre Coal & Iron Co.	15,899 15	783,443 07
	35,356 13	1,348,618 06
Increase	.....	388,069 17
Decrease	10,214 18	.....

Philadelphia & Reading Railroad and Branches.

COAL TONNAGE

For the Week ending Saturday, Nov. 23, 1872.

BY RAILROAD.—ANTHRACITE.

PASSING OVER MAIN LINE AND LEB. VAL. BRANCH.	Tons.	Cwt.
From St. Clair	26,176	07
" Port Carbon	3,477	07
" Pottsville	2,819	14
" Schuylkill Haven	20,480	12
" Pine Grove	5,619	18
" Tamaqua	13,581	07
" Harrisburg		
" Dauphin	5,930	08
Total	78,085	13
FOR SHIPMENT BY CANAL.		
Passing Frackville Scales	8,738	15
" Mill Creek "	3,223	04
" Schuylkill Valley Scales	154	08
" Mt. Carbon "	1 518	01
" Cressona "	6,960	10
" Pine Grove "		
" Tamaqua "	1,683	13
Total	22,278	14
SHIPPED WESTWARD VIA CATAWISSA AND WILLIAMSPORT BRANCH AND NORTHERN CENTRAL RAILROAD.		
Via Catawissa & Williamsport Br.	215	01
" N. C. R. R. passing Locust Gap	1,865	08
" " " Shamokin	1,670	14
" " " Herndon	....	
Total	8,751	03
SHIPPED WEST OR SOUTH FROM PINE GROVE.		
Via Schuylkill & Susquehanna R. R.	1,086	09
" Lebanon & Pine Grove Branch	869	07
Total	1,955	16
CONSUMED ON LATERALS.		
From Frackville Scales	351	09
" Mill Creek "	637	07
" Schuylkill Valley Scales	1,471	03
" Mt. Carbon "	1,435	10
" Cressona "	804	14
" Pine Grove "	89	00
" Tamaqua "	593	08
Total	5,382	11
LEHIGH AND WYOMING COAL.		
Received via Silverbrook Junction, Sent East	5,140	04
Cat. & Wpt. Br. Sent West	39	15
" " Rupert, Cat. & Wpt. Br.		
" " Allentown, E. Penn'a Br.	124	00
" " Alburtis, " "	....	
" " Oreland, G. & N. Br.	989	17
" " Connecting R. R.	....	..
" " Willow Street R. R.	359	09
Total	6,653	05
BITUMINOUS.		
From Harrisburg	5,344	17
" Connecting R. R., G. & N. Br.		
" Junction R. R.	10	00
Total	5,354	17
COAL FOR COMPANY'S USE.		
Anthracite	6,651	17
Bituminous	186	09
Total.	6,838	06

RECAPITULATION.

	Total for Week.	Corres-p'g week last year.	Increase and Decrease.
Passing over Main Line and Leh. Val. Branch	78,085 13	86,141 06	d 8,055 13
For Shipment by Canal	22,278 14	25,646 16	d 3,368 02
Shipped Westward via Northern Central R. R.	8,751 03	5,267 18	i 3,483 05
Shipped West or South from Pine Grove	1,965 16	2,282 08	d 316 12
Consumed on Laterals	5,382 11	3,767 01	i 1,615 10
Lehigh and Wyoming Coal	6,653 05	1,401 05	i 5,252 00
Total Anthracite paying freig't	123,117 02	124,506 14	d 1,389 12
Bituminous	5,354 17	11,429 06	d 6,074 01
Total of all kinds paying freig't	128,471 19	135,935 00	d 7,464 01
Coal for Company's use	6,838 06	5,994 19	i 843 07
Total Tonnage for Week	135,310 05	141,930 13	d 6,620 14
Previously this year	5933491 19	5773280 08	i 160,211 11
Total to date	6068802 04	5915211 07	i 153,590 17
SHIPPED BY CANAL.			
From Schuylkill Haven	20,606 10	27,174 09	d 6,567 19
" Port Clinton	2,659 00	1,783 00	i 876 00
Total Tonnage per Week	23,265 10	28,957 09	d 5,691 19
Previously this year	796.734 00	965,903 14	d 169,169 14
Total to date	819,999 10	994,861 03	d 174,861 13

Northern Central Railway, Shamokin Division.

Below is the return of Coal sent over the Shamokin Division of the N. C. R. W., for the week ending November 23, 1872.

	Tons.	Cwt.
East	1,865	14
West	12,562	05
	14,427	19
Same time last year	11,830	07
Increase	2,597	12
Decrease	.....	
Total amount shipped to date	525,978	12
Same time last year	584,764	00
Increase	.....	
Decrease	58,785	08

Lehigh Canal Coal Trade.

Shipped for the week ending November 22, 1872.

	Week. Tons. Cwt.	Week. Tons. Cwt.
Total from Manch Chunk Region	3,953 13	235,802 10
" " Hazardville "	1,077 00	9,514 09
" " Beaver Meadow "	2,161 00	147,592 02
" " Mahanoy "	483 12	12,490 07
" " Hazleton "	3,577 12	226,622 14
" " Upper Lehigh "	871 12	28,788 12
" " Wyoming "	3,957 02	90,332 07
" " do do Hazardville	97 18	2,769 01
Total	16,179 09	753 912 02
Corresponding week last year	29,396 03	722,330 04
Increase	.....	31,581 18
Decrease	13,216 14	

Delaware and Hudson Canal Company.

Coal mined and forwarded by the Delaware and Hudson Canal Company for the week ending Saturday, November 23, 1872.

	WEEK.	SEASON.
North	37,296 10	2,305,001 12
South	5,133 14	351,447 16
Total 1872	42,430 04	2,656,449 08
Corresponding time in 1871:		
North	54,860 19	1,444,350 02
South	9 956 13	307,515 07
Total	64,817 12	1,745,865 09
Increase North		
Decrease North		
Increase South		
Decrease South		
Total increase 1872		910 583 19
Decrease	22,387 08	

Delaware Lackawanna & Western Rail Road Company.

Coal transported on the Delaware, Lackawanna, & Western Railroad for the week ending Saturday, Nov. 23, 1872.

	WEEK. Tons. Cwt.	YEAR. Tons. Cwt.
Shipped North	15,348 05	724,013 05
Shipped South	17,320 11	1,867,450 03
Total	32,668 16	2,596,463 14
For the Corresponding time last Year:		
Shipped North	11,844 15	503,671 17
Shipped South	48,563 00	1,124,277 09
Total	60,407 15	1,627,943 06
Increase		968,514 08
Decrease	27,738 19	

Statement of Coal Transported over Cumberland and Pennsylvania Railroad

During the week ending Saturday Nov. 23. and during the year 1872, compared with the corresponding period of 1871.

WEEK.

	C. & O. C'l Tons. Cwt.	B. & O. R. R. Tons. Cwt.	Pa. S. Line Tons. Cwt.	Total. Tons. Cwt.
1872	5,282 17	29,993 06	2,176 14	37,062 07
1871	14,211 15	25,595 09	....	39,717 04
Increase	....	4,397 17	....	2,654 17
Decrease	8,929 08	....	2,176 14	....

YEAR.

1872	6 6 259 07	1,113,938 07	7,598 10	1,727,816 04
1871	34?,9:9 09	1,121,847 18	....	1,765,767 07
Increase	....	22,110 0.	7,598 10	....
Decrease	37,600 01	....	....	7,951 03

Cumberland Branch R. R.

WEEK.

	To C. & O. Canal. Tons. Cwt.	To P. & O. R. R. Co Tons. Cwt.	Total. Tons. Cwt.
1872	3,2 6 16	483 19	3,700 15
1871	4,863 03	1,677 00	6,550 03
Increase	....	....	....
Decrease	1,656 07	1,193 01	2,849 08

YEAR.

1872	201 044 19	20,842 10	221,9 7 09
1871	190,463 06	64,374 06	254,837 12
Increase	10,6.1 13	....	....
Decrease	....	43,531 16	32,910 04

Penn. and N. Y. R. R.—Coxton, Pa.

Coal tonnage for week ending November 23, 1872.

	Week. Tons. Cwt.	Total. Tons. Cwt.
Anthracite received:		
From Lehigh Valley R. R.	3,357 19	347,942 06
" Lack. & B. R. R.	1 5 8 18	73,208 19
" Pleasant Valley R. R.	2,3 6 05	101 497 13
" Sul. & Erie R. R.	412 19	50,094 02
Total	7,045 01	572,793 00
Distributed:		
To Lehigh Valley R. R.	940 15	37 970 15
To Lack. & B. R. R.	16 14	1,100 04
To S. Central R. R.	1,370 12	108 958 08
To Ithaca & A. R. R.	1,055 03	89,958 10
To Erie R. W. Pockets for shipm't.	1,975 18	219,871 12
To individuals on line of road	840 02	23,709 03
To points at & above Coxton for use of Co.	617 18	23,607 04
To points between Waverley and Elmira	828 19	37,527 04
Total	7,646 01	572,793 00
Bituminous received from BARCLAY R. R.		
Shipped north from Towanda	4,720 02	328,739 19
Shipped south from Towanda	....	2,205 17
Northern Central R. R.	33 05	468 12
Total	4,753 07	331,414 08
Distributed:		
To Erie Railway	4,432 06	236,737 16
To So. Central R. R.	257 16	31,747 00
To Ithaca Valley R. R.	....	120 03
Lehigh Valley, R. R.	13 07	1,214 08
To individuals on line of Railroad.	19 18	1,314 10
To points on line of road for use of Company	.....	280 11
Total	4,753 07	331,114 08
Grand totals transported:		
Anthracite	7,646 01	572,793 00
Bituminous	4,753 07	331,414 08
Total	12,399 08	904,207 08

Pennsylvania Coal Company.

Shipments of Pittston Coal for the week ending November 23, 1872.

	1872. WEEK.	1872. YEAR.	1871. WEEK.	1871. YEAR
By Railway	25,936 04	1,177,850 14	26,233 03	689,551 18
" Canal	244 05	6,240 18	....	13,952 04
Total	26,180 09	1,114,091 12	26,238 03	703,514 02
Increase 1872	410,577 10			

Schuylkill Canal.

Report of coal transported over the Schuylkill Canal for the week ending Saturday, November 23, 1872.

	Tons. Cwt.
From Schuylkill Haven	20 606 10
" Port Clinton	2,659 00
Total for week	23,265 10
Previously this year	796 734 00
Total	819,999 10
To same time last year	983,552 05

Report of Coal Transported over Central R.R. of N. J. (Lehigh and Susq. Div.)

Week ending November 23—Compared with same time last year.

WHERE SHIPPED FROM	WEEK 1874, tons ct	WEEK 1871, tons ct.	YEAR 1872 tons cwt.	YEAR 1871, tons cwt.
Wyoming Region	21341 12	26956 04	1267777 12	1178869 09
Upper Lehigh Region	4463 11	4 21 15	181816 14	94170 16
Hazleton Region	4033 10	2278 09	2370.1 08	2 59.9 14
Beaver Meadow Region	5074 08	30.4 09	151745 18	7.568 18
Mauch Chunk Region	5695 15	6174 00	397875 03	266551 10
Frescaow Region				
Mahanoy Region				
Totals	40628 16	48554 15	2339226 15	1757892 17
Increase	7945 19		581333 18	
Decrease				
DISTRIBUTION.				
Forwarded East of Mch Chunk by Rail	27974 15	29411 16	1576251 12	1162900 06
Forwarded East of Mch Chunk by Canal	6865 15	13597 04	484293 2!	410833 15
Delivered at and above Mauch Chunk	1662 17	2130 17	57218 03	61875 12
L. V. R. R at Packer'n	213 19	364 12	13454 06	28026 17
Delivered to L. & B. R. R. at Plymouth Bridge	3891 10	3050 06	208009 03	94256 07
Totals				
Of the above there was transported on acc'nt of L. C. & N. Co.	10177 14	10293 11	604050 19	308025 19
W.-B. C. & I. Co.	10710 08	15899 15	896834 14	783443 07
Tota's	21188 02	26193 06	1500 85 13	1091469 06
Increase			409416 07	
Decrease	5005 04			

Report of Coal Transported over Lehigh Valley Railroad

Report of coal tonnage for the week ending Nov. 23, 1872, with totals to date, compared with same time last year.

WHERE SHIPPED FROM.	WEEK. Tons. Cwt.	TOTAL. Tons. Cwt.
Total Wyoming	8,993 09	101 0 5 18
" Hazleton	4,819 19	2,164 4.6 16
" Upper Lehigh	124 05	2,057 05
" Beaver Meadow	10,117 09	751.212 16
" Mahanoy	8,258 07	278,4 4 13
" Mauch Chunk	24 02	2,634 07
Total	66,737 02	3,900,751 15
Same time last year	84,603 04	2,736,448 15
Increase		1,064,303 00
Decrease	17,866 02	
Forwarded East from Mauch Chunk by rail	54,480 14	2,970,158 15
Same time last year	61,386 07	2,176,468 09
Increase		793,690 06
Decrease	6,905 13	
DISTRIBUTED AS FOLLOWS.		
Forwarded East from Mauch Chunk by rail	53 334 19	2,924,572 16
do East for use L. V. R. R.	1,145 15	45,635 19
Delivered at and above Mauch Chunk for use of L. V. R. R.	1,267 18	56,180 19
To P. & N. Y. R. R.	3,357 19	347,942 16
To N. C. R. R., at Mount Carmel		2,664 09
To D. H. & W. R. R.	1,201 17	30.602 14
To L. & S. R. R. at Packerton for rail	395 00	13.654 06
Delivered at M'h Chunk	47 11	2,454 00
Delivered on line of road above Mauch Chunk	356 00	15,699 03
To L. S. & R. R., at Penn Hav., for railroad		4,011 19
Do for canal	3,577 12	227.089 01
To Lehigh Canal Mauch Chunk	1,947 11	120,825 19
To Catawissa Railroad	5 00	9,065 04
Total	66,737 02	3 800,751 15

Delaware and Hudson Canal Company.

The following is a statement of Coal Transported by the Delaware and Hudson Canal Co. for the week ending Nov. 23, 1872.

	FOR THE WEEK.	FOR THE SEASON.
By Delaware and Hudson Canal,	32,878	1, 6 ,993
By Railroad, East	7,402	501,703
" " West	8,761	3?7,254
" " South	5,134	331,448
Total Tons	54,175	2,609,498
For the same period last year.		
	FOR THE WEEK.	FOR THE SEASON.
By Delaware and Hudson Canal,	37,375	991,737
By Railroad, East,	8,597	308,525
" " West	3,465	106,537
" " South	9,956	301,515
Total Tons	59,393	1,708,364
Increase	891,134	

Prices of Coal by the Cargo.

[CORRECTED WEEKLY.]

Company Coals.

November, 1872.

	L.	Str.	Gra.	Eg.	Sto.	Chest
*Scranton at E. Port	3 45	3 45	3 65	3 70	4 00	3 50
*Pittston at Newburg	3 80	3 80	3 80	3 80	4 00	3 80
*Lackawana at Weehawken	4 01	4 10	4 10	4 30	4 00	3 60
Wilk'b're at Hoboken	3 60	3 65	3 85	3 85	4 00	4 10
Old Co. Lehigh at Pt. John'n	5 25	—	4 50	4 50	4 60	4 00
Lehigh at Eliz. Port	5 00	—	4 60	4 60	4 80	4 00

For freights to different points see "Freights."
To contractors only.

	AT NEW YORK. November 29. R. A.	W. A.	AT PHILADELPHIA. November 23. R. A.	W. A.
SCHUYLKILL.				
Lump	$— —	$— —	— —	
Steamer	— —	— —	— —	— —
Broken	— —	— —	— —	
Egg	5 25	4 75	— —	— —
Stove	5 50	5 00	— —	— —
Chestnut	4 25	—	— —	
Pea	— —	— —	— —	— —
LEHIGH.				
Lump, (along side)	5 35	—	— —	— —
Broken	4 60	— —	— —	— —
Egg	4 60	— —	— —	— —
Stove	4 85	— —	— —	— —
Chestnut	4 35	— —	— —	— —
Pea	— —	— —	— —	— —
SPECIAL COALS.				
Honey Brook, Le'h W.A.	4 00@5 00		— —	— —
Spring Mountain " "	— —@— —		— —	— —
Sugar Creek " "	— —@— —		— —	— —
Sugar Loaf " "	— —@— —		— —	— —
Old Compy's " "	4 00@5 15		— —	— —
Room Run " "	4 00@4 50		— —	— —
McNeal " "	— —		— —	— —
Girardville " "	— —		— —	— —
Hill & Harris " "	— —		3 10@4 00	— —
Shamokin " "	— —		— —	— —
Lykens Valley " "	— —		— —	— —
Broad Top " "	— —		— —	— —
McMichael " "	— —		3 25@4 25	— —
Henry Clay " "	— —		— —	— —
Powelton " "	— —		— —	— —

Prices at Baltimore—November, 1872.

Wholesale Prices to Trade.

Wilkesbarre, by cargo or car load	$5 35@5 60
Pittston and Plymouth, do	6 25@6 50
Shamokin Red or White Ash, do	5 5 @5 75
Lykens Valley Red Ash, do	6 25@6 50
Zerba Valley	
Treverton	
By retail, all kinds per ton of 2,240 lbs	7 25@7 50
George's Creek and Cumberland f. o. b. at Locust Point for cargoes	@4 75
Fairmont and Clarksburg gas f. o. b. at L. Point	6 00
BITUMINOUS COALS.	
Kittaning Coal Co.'s Phœnix Vein, f. o. b. at Phila	$
Lemon " " "	
Cumberland Vein Coal	
Consolidation Coal Co.'s on board N. Y.	
Maryland Coal Co. "	

Prices at Georgetown, D.C., and Alexandria, Va.

November, 1872.

George's Creek and Cumberland f. o. b. for shipping $4 35@4 50 [nominally.

Prices at Havre de Grace, Md.

November, 1872.

Wilkesbarre and other White Ash for Cargoes	$ @4 75
Lykens Valley	@5 75
Shamokin Red or White Ash	5 00

Bituminous Coals (Cumberland).

Georgetown, F. o. b.	$4.25
Baltimore	4.65
New York	5.65

Prices of Gas Coals.

November, 1872.

PROVINCIAL.

Corrected weekly by Louis J. Beiloni, Jr., 41-43 Pine st., N. Y

	Course	Slack.
Block House	$2 00	$1 00
Gowrie	1 75	— 80

Vessels are being chartered at $4 25.

Corrected by Bird, Perkins & Job, 27 South street.

	Course.	Culm of Coal,
Picton, nett	$2 25	1 25
Sydney	2 25	- 80
Lingan	1 75	- 80
Caledonia	1 75	- 80

A discount from the prices of the coarse Coal on purchase of 5000 tons and upwards. Duty on all slack coal or Culm: 40c. per ton of 28 bushels, 80 pounds to the bushel. On all bituminous coal or shale: 75 cents per ton of 28 bushels.

AMERICAN.

	Currency.
Westmoreland	$7 10 @— —
Fairmount Gas Coal Co. of N. Y.	7 00 @— —
Despard Coal Co.	7 00 @— —
Penn.	7 10 @— —
Newburg Orrel Gas	— — @— —
West Fairmount Gas Coal	7 00 @— —
AT PHILADELPHIA.	
Westmoreland	7 00 @— —

Prices of Foreign Coals.

November, 1872.

Duty 75 c. per ton.

Corrected weekly by ALFRED FARMELE, No. 32 Pine street, N. Y.

Liverpool Gas Coking	$ 8 00@— —
" " Cannel	12 00@13 00
" House "	19 00@20 00
" Orrel	14 00@16 00

Per ton 2,240 lbs., ex-ship.

PRICES FROM YARD.

Liverpool House Orrel, screened	$16 00@18 00
"Cannel, "	19 00@23 00

Per ton 2,000 lbs. delivered.

Rates of Transportation to Tide Water.

BY RAILROAD.

TO PORT RICHMOND, PHILADELPHIA.

Philadelphia and Reading Railroad, from Schuylkill Haven for consumption ($1 85 less 55c. drawback)	$1 30
For reshipment	1 75

MAUCH CHUNK TO ELIZABETHPORT.

L. V. Railroad from Mauch Chunk to Phillipsburgh	$0 66
C. R. R., N. J., Phillipsburgh to Elizabethport	0 98
Shipping expenses at Elizabethport	25
Wharfage	10
Total	$1 99

MAUCH CHUNK TO PORT JOHNSON.

L. V. R. R., or L. & S. R. R. from M. C. to Phillipsb'g	$0 66
C. R. R., of N. J., Phillipsburgh to Pt. Johnson	0 98
Shipping expenses	25
Wharfage	
Total	$1 99

TO HOBOKEN.

L. V. R. R., Mauch Chunk to Phillipsburgh	66
Morris & Essex R. R. Phillipsburgh to Hoboken	0 98
Shipping expenses	25
Wharfage	
Total	$1 99

TO SOUTH AMBOY.

L. V. R. R.	66
R. & D. R. R. / Cam. & Am. R. R.	93
Shipping Expenses	25
Total	$1 99

PENN HAVEN TO ELIZABETHPORT.

L. V. R R. Penn Haven to Phillipsburgh	0 70
C. RR. of N. J. Phillipsburgh to Elizabethport	0 98
Shipping expenses	25
Wharfage	10
Total	$1 99

Foreign and Provincial Freights.

November 1872.

Foreign.

Newcastle and Ports on Tyne, per keel of 21 1-5 tons £
Liverpool, 5 per cent primage

TO NEW YORK.

Provincial.

Sydney	$3 05
Lingan	3 50
Cow Bay	3 75
Port Caledonia	3 10
Little Glace Bay	3 00

TO BOSTON.

Sydney	3 00
Lingan	3 00
Cow Bay	3 00
Port Caledonia	3 00
Little Glace Bay	2,90

Freights.—November, 1872.

TO EASTERN PORTS.	Cumberland. From Georgetown.	Cumberland. From Baltimore	Anthracite. From Philadel'a.	Anthracite. From Elis. Port, Port Johnston, and Hoboken.	Anthracite. From Newburgh.	Anthracite. From Rondout.
Amesbury						
Bangor						
Bath						
Boston	3 10	3 00		2 35	2 65	
Bridgeport	2 15	2 40		1 00	1 25	
Bristol				1 40	1 60	
Cohasset Nar'ows	2 25					
Derby				1 25	1 40	
Dighton	2 85					
East Cambridge				2 40	2 65	
Fall River	2 75	2 50		1 40	1 65	
Hackensack						
Hartford				1 70	1 90	
Hoboken	2 10			50	60	
Jersey City	2 10			50	60	
Lynn						
Middletown				1 60	1 80	
Mystic		2 75		1 40	1 60	
New Bedford	3 00	2 75		1 40	1 65	
Newburyport	3 10	3 25		2 60	2 75	
New Haven	2 75	2 40		1 00	1 25	
New London	2 75	2 50		1 30	1 45	
Newport	2 30	1 90		1 40	1 65	
New York	2 25	2 10		50	60	
Norwalk	2 50	2 50		1 00	1 25	
Norwich		2 75		1 40	1 55	
Pawtucket		2 75		1 50	1 65	
Portland	3 25	3 00		2 30	2 60	
Portsmouth, N.H		3 25		2 50	2 75	
Providence	2 75	2 75		1 40	2 56	
Rockport						
Saco						
Sag Harbor		3 00		1 30		
Salem	2 70	3 25		2 35	2 65	
Stamford				1 00	1 25	
Stonington				1 40	1 60	
Taunton				1 90	2 10	
Warren				1 40	1 65	
TO RIVER PORTS						
Albany		2 40				
Catskill						
Cocksackie						
Coeyman's						
Cold Spring	2 30	2 25				
Fishkill						
Haverstraw						
Hudson	3 25	2 30				
New York						
Nyack	2 25					
Poughkeepsie	2 50					
Rhinebeck						
Rondout						
Saugerties						
Sing Sing						
Stuyvesant						
Tarrytown						
Troy	3 00	2 50				
West Point						
Yonkers						

St. Thomas	$5 00 Gold.
Martinique	5 00 "
Demerara	6 00 "
New Orleans	6 00 "
Mobile	6 00 "

MARKET REVIEW.

IRON—The market for Scotch Pig is tolerably active, especially for the common brands; prime brands are held firmly, with light stocks. In a jobbing way about 700 tons Eglinton have changed hands at $47a48, and 150 do. Summerlee and 100 do. Carnbroe on terms not made public. American Pig, in absence of any demand of moment, has relapsed into a very quiet state; though we quote No. 1 $50a51, and No. 2 $48a51, these figures are entirely nominal, and any lot forced on the market would not bring within several dollars of these rates. We hear of no sales. New English rails are very quiet, and in absence of sales our quotations are entirely nominal; old are selling in small lots at $50a51, currency; 200 tons D. H. brought $50. New American are without sales. There is some inquiry for future delivery after next February, but no business is yet reported. Scrap is dull and entirely nominal at $40 from dock, and $45a48 from yard; 150 tons heavy Wrought and Cast, a ship lot, sold at $34, cash; 200 do. No. 1 $45, from yard; and 300 do. from dock, on private terms. The market for Bar from store is dull at our reduced quotations of last week.

PHILADELPHIA, Nov. 25.—(From Circular of Edward Samuel).—The market for all grades of American Pig Iron has been excessively quiet for the past week, and the quotations are purely nominal, as sales are reported at quite different figures. Old Rails and Scrap Iron are dull, and almost impossible to sell. In Merchant Bars, although the Eastern basis is 4¼ cents per lb., yet some mills that are not full of orders are offering to sell at still lower figures. The general market may be quoted weak.

LEAD—The demand for Pig is very limited, and there is no response to the higher quotations from abroad; we quote nominally as before, ordinary Foreign $6,65a 6,62½ per lb., gold. Manufactured is steady at our quotations.

COPPER—New Sheathing is steady at 43 cents, and Bolts and Braziers 45; Bronze and Yellow Metal Sheathing 27, and Y. M. Bolts 32, net cash. The market for Ingot is at a stand and we hear of no sales; cash lots of Lake are held at 31 cents, for delivery all next month 31¼, and for January to march 32. English is in good supply; held at 28½ cents, without business.

STEEL—The market is firm at our quotations, retail lots only bringing anything more.

SPELTER—Foreign is still neglected, and our quotation of 6½a6¾ cents gold is wholly nominal. Domestic is quoted at 10c. currency.

TIN—Pig remains very dull and prices still yield; 50 slabs Straits sold at 34¼ cents, and it is rumored and generally believed, that 800 slabs have changed hands at 29. The general asking prices, however, are for Straits 30 cents, English 30, and Banca 35, all gold. Cables of yesterday from London quote a decline on Straits of 2s., now 134s. The demand for Plates continues very limited and prices are still nominal. Jobbing lots, in a regular way, sell at about asking prices, but full parcels could not be forced probably even at our lowest figures.

ZINC—Sheet is dull at about former quotations. Manganese black oxide 3½ cents, Peroxide gray 5 cents.

METALS.

NEW YORK, November 28, 1872.

IRON.—Duty: Bars, 1 to 1½ cents ℔ lb; Railroad, 70 cents ℔100 lbs.; Boiler and Plate, 1½ cents ℔ lb; Sheet, Band, Hoop, and Scroll, 1¼ to 1¾ cents ℔ lb; Pig, $7 ℔ ton; Polished Sheet, 3 cts. ℔ lb; Galvanized 2½; Scrap Cast, $6; Scrap Wrought, $8 per ton.

All less 10 per cent. No Bar Iron to pay a less duty than 35 per cent. ad val.

	Store Prices.
Pig, Scotch—Coltness ℔ ton	55 00@— —
Gartsherrie	50 00@53 00
Glengarnock	48 00@50 00
Eglinton	47 00@48 00
Pig, American, No. 1	50 00@54 00
Pig, American, No. 2	48 00@51 00
Pig, American, Forge	41 00@45 00
Bar Refined, English and American	— —@120 00
Bar Swedes, assorted sizes (gold	120 00@130 00
	Store Prices, Cash.
Bar, Swedes, 1¾ to 5 x ⅜ & ⅞ 2 sq. & 6 to 12 x ⅜ & ⅛	145 00@155 00
Bar, Refined, ⅜ to 2 in. rd. & sq. 1 to 6 in. x ⅜ to 1 in.	— —@105 00
Bar, Refined, 1¼ to 6 by ¼	110 00@— —
Bar, Refined, 2½ to 2⅞ round 1 & 1⅛ by ¼ & 5:16	112 50@— —
Large Rounds	112 50@125 00
Scroll	121 00@150 00
Ovals and half-round	130 00@150 00
Band	— —@122 50
Horse Shoe	117 00@127 50
Rods, ¾ to 3-16 inch	110 00@152 50
Hoop	127 50@172 50
Nail rod	@ 9
Sheet, Russia, as to assortment (gold)	16 @ —
Sheet, Singles, D. and T. Common	—7 @— 8
Sheet, D. and T. Charcoal	—8½@— 9
Sheet, Galv'd, list 10 per cent, discount	—@— —
Rails, English (gold), ℔ ton	71 00@ 72 50
Rails, American, at Works in Pennsylvania, currency	80 00@ 82 50

COPPER.—Duty: Pig, Bar, and Ingot, 5; old Copper 4 cents ℔ lb; Manufactured, 45 per cent. ad val.

	All Cash.
Copper, New Sheathing, ℔ lb	— @— 43
Copper Bolts	— @— 45
Copper Braziers, 16oz. and over	— @— 45
Copper Nails	— @— 45
Copper, Old Sheathing, &c. mixed lots	26 @— 28
Copper, Old, for chemical purposes, 14@16 oz	— @— —
Copper, American Ingot	30¾@— 31
Copper English Pig	28½@— —
Yellow Metal, New Sheathing & Bronze	— @— 27
Yellow Metal Bolts	— @— 32
Yellow Metal Nails	27 @— 30

LEAD.—Duty: Pig, $2 ℔ 100 lbs.; old Lead, 11½ cents ℔ lb; Pipe and Sheet, 2½ cents ℔ lb.

Galena, ℔ 100 lbs	$— — @— —
Spanish (gold)	6 50 @6 62½
German, do.	6 50 @6 62½
English do.	6 6½@7 00
Bar (net)	9 25 @— —
Pipe (net)	— — @11 00
Sheet	— — @11 50

Colwell, Shaw & Willard Tin-Lined Lead Pipe 16½ cts. ℔ lb.

STEEL.—Duty: Bars and ingots, valued at 7 cents ℔ lb or under, 2½ cents; over 7 cents and not above 11, 3 cents ℔ lb; over 11 cents, 3½ cents ℔ lb, and 10 ℔ cent ad val. Store prices.

English Cast (2d and 1st quality) ℔ lb	— 18 @— 22
English Spring (2d and 1st quality)	— 9½@— 10½
English Blister (2d and 1st quality)	— 11½@— 16
English Machinery	— 11½@— 14
English German (2d an 1st quality)	— 11½@— 12
American Blister "Black Diamond"	— — @— 11½
American, Cast, Tool do.	— — @— 17
American, Spring, do.	— — @— 11
American Machinery do.	— — @— 11½
American German, do.	— 9 @— —

TIN.—Duty: Pig, Bars, and Blocks, 15 ℔ cent. ad val.; Plate and Sheets and Terne Plates, 25 ℔ cent.; Roofing 25. ad val.

	Gold ℔ lb.
Banca	35 @—
Straits	— @30
English	— @30

PLATES. *Fair to Good Brands.*	*Gold.*	*Currency.*
I. C. Charcoal, ℔ box	$11 75 @11 25	$12 75 @13 25
I.C. Coke	9 00 @ 9 75	10 50 @11 50
Coke Terne	8 75 @ 9 75	10 25 @10 75
Charcoal Terne	9 75 @10 25	11 50 @12 00

SPELTER—Duty: In Pigs, Bars & Plates, $1.50 p. 100 lb

Plates, Foreign (gold) p. 100 lb.	6 6½@ 6 87½
Plates, Domestic p lb.	8¾@— 10¾

ZINC—Duty: Pig or Block, $1.50 per 100 lb.; Sheet 2½c. per lb

Sheet per lb.	— 10 @ 10½

San Francisco Stock Market.

BY TELEGRAPH.

NEW YORK, Nov. 28, 1872.

Our report from the San Francisco Stock Board is dated the 26th inst. With the exception of an advance of $15 in Gould & Curry, the list has slightly declined. We have also appended the report of the 21st.

		Nov. 21.	Nov. 19
Savage	—	90	85
Crown Point	—	120	118
Yellow Jacket	—	—	107
Kentuck	—	—	210
Cholliar Potosi	—	71	70
Gould & Curry	—	237	225
Belcher "New Issue"	—	106	106
Imperial	—	11	—
Raymond & Ely	—	110	105
Meadow Valley	—	23	20

DROWN & CORLISS,

ANALYTICAL CHEMISTS,

AND

CONSULTING METALLURGISTS.

1123 GIRARD STREET,

PHILADELPHIA.

THOMAS M. DROWN. GEORGE F. CORLISS.

W. B. COGSWELL,

Civil & Mechanical Engineer.

SPECIALITY:

Blast Furnace Construction.

P. O. Address

Franklin Iron Works,

Oneida County,

Nov. 19:1y N. Y.

JOHN J. ENDRES,

Mining and Civil Engineer,

MANUFACTURER OF MACHINERY FOR MINING AND SMELTING PURPOSES,

SPECIALITY:

Patent Ore and Coal Crushing and Washing Machines.

BUILDER OF IMPROVED COKE OVENS AND MACHINERY FOR DISCHARGING THE SAME.

Office and Works:

SOUTH PITTSBURGH, PA.

Nov. 26:3m

R. P. ROTHWELL,

MINING AND CIVIL ENGINEER,

ROOMS 90, 91,

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Labor and Wages in Belgium.

Some interesting statistics have been published of the changes which has taken place in the state of wages paid to the Belgian coal miner during the last 20 years. The figures are as follows :

Year	No. of Workmen.	Average Daily Wages. s.	d.	Tons per man. yearly.
1852	51,873	1	5	131
1853	54,204	1	7	132
1854	62,194	1	10	129
1855	70,980	2	0	118
1856	73 585	2	0	111
1857	72,577	1	11	115
1858	73,850	2	0	120
1859	77,293	2	1	119
1860	78,282	2	0	122
1861	81,775	2	0	123
1862	80,302	1	11	123
1863	79,187	1	11	130
1864	79,779	2	0	139
1865	82,368	2	2	143
1866	86,721	2	6	147
1867	93,339	2	5	137
1868	89,382	2	3	136
1869	89 928	2	3	143
1870	91,993	2	5	148
1871	94,286	2	5	145

This shows that wages have advanced 71 per cent. while through the improvements in machinery, modes of getting coal, etc., the extraction per man has increased 10·7 per cent. But this improvement has been obtained only by increasing the accessory expenses of mining, which during the same period of time have fluctuated as follows :

Year.	Per ton. s.	d.	Year.	Per ton. s.	d.
1852	2	7	1862	3	6
1853	2	7	1863	3	5
1854	3	0	1864	3	2
1855	3	2	1865	3	2
1856	3	7	1866	3	5
1857	3	7	1867	3	7
1858	3	6	1868	3	4
1859	3	6	1869	3	5
1860	3	4	1870	3	4
1861	3	5	1871	5	6

This increase amounts to 35 per cent. The two items of wages and accessories added together show that the total cost of extraction has risen from four shillings in 1852 to 5 shillings 11 pence, the increase amounting to 48 per cent. In 1852 the price of coal in Belgium was 6 shillings 6 pence, and in 1871 it had advanced to 9 shillings 4 pence. The profit has remained about stationary, being at the extremes of the 20 years as follows :

	s.	d.		s.	d.
1852	0	8	1869	0	6
1853	1	0	1870	0	9
1854	1	8	1871	0	10

Thus while the miner has seen his condition greatly improved the capitalist has been forced to witness a diminution of his profit per ton, from an average of 14½ pence during the first 10 years to 10½ pence during the second decade. It is but just to remark, however that in this respect the business of coal mining only obeys the law to which all trades are subject, of a diminution of *pro rata* profits, combined with the immense increase in sales, which takes place as population grows denser and industries expand. The yield of the Belgium coal mines has grown from 773,000 tons in 1836 to 4,186,000 tons in 1871.

The Lake Superion Tin Discoveries.

According to the Portage Lake *Gazette* the obscure question of the existence of tin on the north shore of Lake Superior bids fair to receive elucidation. That paper says : The unaccountable mystery that has surrounded the claimed discovery of tin upon the north shore of Lake Superior, and the unenviable relations that have existed between the discoverer and certain parties to whom he had sold interests, will, it is believed, soon culminate in certain knowledge of either the worthlessness or value of the find. A party of gentlemen representing large interests in the property, together with several experts and press representatives, started last week with the original discoverer, who proposes to fully satisfy them of the genuineness of his claim.

Telegraphing during the Boston Fire.

The *Journal of the Telegraph*, published in New York, gives an interesting account of how the lines of the Great Western Union Telegraph Company were maintained in Boston during the late fire. It says :

"The great fire at Boston afforded an opportunity to the employees of this Company to show what activity and intelligence, combined with the resources at their command, can do to mitigate the evils of a great disaster, in furnishing abundant and prompt means of communication. Although the fire interrupted all communication with the principal offices in that city at an early hour on Sunday morning, and the destruction of the principal office was so imminent that the office furniture and apparatus were removed for safety, yet telegraphic communication with Boston continued uninterruptedly, the messages being received at and delivered from the various railway stations, at which the Company already had offices. Communications sent to and received from the Atlantic Cables were sent via Portland and Montreal until the temporary interruption at Boston was removed. At an early hour on Sunday morning, Gen. Eckert, the General Superintendent of the Eastern Division, came to the main office and immediately took vigorous measures for reconstructing the lines and offices at Boston. Men and material were promptly despatched from Portland, White River Junction, New York and other places. A special train left this city for Boston at 7 o'clock with material, and at 9 o'clock a sleeping-car containing Gen. Eckert, Manager Brown, Mr. Mackintosh, foreman of repairs, with a corps of line-men and a dozen operators, also started for the scene of disaster.

On Monday morning, operations were resumed upon a limited number of wires at the general office in Boston, and during the day all of the wires but two were working from the general and branch offices. In the meantime, there was an immense amount of telegraph business performed by the Company. Over twenty thousand paid messages were sent on Monday from the principal office in this city. All the facilities of the Company were called into requisition for expediting the business. During the past week Stearns' Duplex Telegraph has been of the greatest value to the Company, and particularly upon the wires between this city and Boston, where four sets are in operation. Previous to the fire but two sets of the Duplex were worked between these points, but on Monday afternoon it became evident that four sets could be used to advantage. As an illustration of the facility with which the means of communication may be multiplied by utilizing this apparatus, a single fact may be mentioned : at 3 o'clock on Monday afternoon, a request was made from Boston that two additional sets of Duplex be forwarded that night—the instruments were promptly packed and sent by Adam's Express, and were delivered in Boston at 8 o'clock the next morning. At 9 o'clock the instruments were ready for use. Thus, in the space of eighteen hours, the instruments were transported a distance of 250 miles, put in operation, and two wires were thus practically converted into four. The four sets of Duplex which have been operated between this city and Boston, during the past week have practically given us four extra wires between these two cities. If the Company possessed Alladin's wonderful lamp, it is very much to be questioned whether the genii who obey the mandates of its owner could double these facilities with any more promptness than they were achieved by the use of Mr. Stearns' magical apparatus.

Engineering and Mechanical Notes.

Experiments have been recently made by M. Tréve, an officer in the French Marine, and by M. Chédeville, Directeur du Génie Maritime, at Brest, with a view to ascertain if the action of magnetism upon steel, changes its structure and reduces its resistance. We extract from a note, presented by M. Tréve to the Academy of Sciences, the following remarks : Two cylindrical moulds, exactly similar, were filled with cast steel. One of these moulds was surrounded with a coil, made by M. Ruhmkorf, through which was passed a current from a 12-element Bunsen battery, during the whole time that the metal was cooling. The other casting was allowed to cool gradually, in the ordinary manner. At the end of ten hours the moulds were broken ; the two steel cylinders were removed, and were broken into several pieces, in order that their structure might be examined. It was stated that the grain of the metal presented different appearances in the two cylinders. In that one submitted to magnetic action, during the time of cooling down—a period when the molecules could most easily arrange themselves—the grain was visibly finer. This experiment, repeated three times, resulted in precisely similar effects. M. Chédevillo afterwards made some comparative experiments on the resisting power to extension and compression, and found that the magnetised steel offered less resistance in every case than the other.

At one of the English professional societies a paper "On an Improved Construction of Tool for Turning Metals at Increased Speed," was read by Colonel Clay, of Liverpool. This tool has one or more holes drilled through it up to its cutting edge, through which a jet of water is delivered underneath the shaving that is being cut, and upon the cutting edge of the tool, for keeping it cool in working. By this means the tool is much more effectually cooled than by the ordinary water jet dropping upon the upper surface of the shaving, in which case little or no water reaches the point of the tool itself. The result of cooling the tool by delivering the water jet direct upon the cutting edge is that the surface speed of the tool can be increased four times in heavy cuts, and light cuts can be taken at as much as eight times the speed that is usually practicable with ordinary tools, without any risk of the temper of the cutting edge being destroyed by overheating. Specimens were exhibited of the tools drilled for supply of water to the cutting edge, which had been tried for both light and heavy cuts with complete success, at greatly increased speeds of working.

Professor Joy says of the mirror photographs which are now popular : "The mirror photographs exhibited at the Fair are silvered glass, with a picture pasted on the back. There is no silver where the picture is seen, but on the sides there is enough metal to give the effect of a mirror. A person could have his photograph taken and so placed upon silvered glass as to enable him to see what the camera had made of him and what reflected light disclosed. If platinum were to be employed instead of silver, the thin film would show no picture by transmitted light, but by reflected light the image would appear. Such a device as this is capable of extensive application in show windows and in interior counting rooms. Glass partitions could be so arranged that persons sitting behind them could see all that was going on in a store while they would themselves be invisible. It appears to me that if a thin gelatin print were to be pasted upon the glass, an engraved picture could be produced by the sand blast, which could be subsequently silvered or not, according to the purposes to which it was to be applied.

The attempt to establish an overland telegraphic communication with Europe by way of Alaska, Behring's Straits and Russia, though a failure as to its main object has not been without fruitful results. The Russian Government put up its lines as far as the Amoor river, and afterwards connected them with the China and Japan lines. Since then the number of messages forwarded has increased in such an unexpected and unprecedented manner that the Telegraph Department has resolved to put up another wire on the Siberian line, and the needful orders have been given for the supply of the materials, and the commencement of the work on the section between Omsk and Tomsk as soon as the weather will permit, next Spring.

THE ENGINEERING AND MINING JOURNAL.

ROSSITER W. RAYMOND, Ph. D.,
JOHN A. CHURCH, E. M.
Editors.

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OUR report on the meeting of the Institute of Mining Engineers is cut short this week by the necessity of waiting a few days for Mr. PECHIN'S remarks upon the Wickersham process. We wish to present this interesting communication and the debate which followed it, in full.

At the request of Hon. J. V. L. PRUYN, one of the two Commissioners for New York, we publish the Address of the United States Centennial Commission. The importance of making our hundredth anniversary useful as well as joyful, and of permanent value as well as of ephemeral interest, is not to be denied. The mining men of the country have especial reasons for taking a prominent part in the celebration. No other occasion can present so excellent an opportunity for gathering and preserving a collection of the ores, and products made from ores, of this country. Every working mine, and every active smelting works in the whole country should prepare and forward a strictly representative collection of its products. No matter how numerous the duplicates may be, there should not be one absentee from that representation. No matter how splendid occasional specimens from the mine are, the collection should represent fairly the ore actually under treatment, and if cabinet specimens are to be had they can be added; but the groundwork of the whole should be a just representation of our mines and metallurgy as they are at the present day. Many establishments have it in their power to send models of tools, furnaces, and other things by which their work is accomplished. If this opportunity is faithfully improved, the country will for the first time contain a collection fairly representative of its important mining industry, and as to the value of such a collection we think there will be no dispute.

WHILE the British financier turns his pious eyes to Heaven whenever the dealings peculiar (?) to Wall street are mentioned, the British colliery proprietor sees in those dealings an example by which to profit. Since the great rise in coal and iron turned its flood-point, people have been studying its upward movement, and endeavoring to ascertain its causes. The general impression is, that the rise in coal was a movement of the masters alone, and that the demands of the colliers followed, instead of preceded, the first advance. Profits, of course, have been immense, and one writer reports having "heard of numerous instances in which this year's profits are 300 or 400 per cent. over those of last year." He then goes on to show that some proprietors, who before made $100,000 to $150,000 a year, have cleared within the last twelvemonth as much as $600,000. A good deal of indignation has been exhibited in England as these facts slowly came out, and our good brethren of the daily press have done their best to transfer some of that feeling to this country, because prices here have risen as high as $4 64 and $5 10 for stove coal! In England, however, there is really reason for discontent. The coal men have made money, but they have thrown the iron trade into the greatest confusion; and though coal has gone down, iron has fallen, too, many masters are embarrassed, and the number of idle furnaces is increasing. The only one of the three parties concerned in the production of iron—the workmen, mine proprietors and iron masters—who comes out of the past season's disorder with permanent advantage, is the workman. His means of living have increased from 30 to 60 per cent., and he will undoubtedly hold forever a good part, at least, of this increase. We shall look with interest to see what the new line of prices is to be in England. With materials and labor both dearer, iron can hardly sell at the old rates, and the business world is looking with a good deal of anxiety to see at what point the fall in prices is to cease. It is possible that at first the former level may be very closely approached, and merchants are said to be holding back orders in anticipation of the return to former figures, but we do not see how labor can be brought back to its former standpoint, nor how iron can be sold at its old figures so long as labor is one-third higher.

Combined Water.

Disputes are continually arising about the amount of water in different fuels, particularly lignite and peat. It is not difficult to determine the amount of *moisture*; and this is frequently assumed to be the whole amount of water. But when analyses are to be treated as evidence of the heating power of fuels, it is not sufficient to determine only the water which is driven off at low temperatures, at, or a little above, the boiling point. The water in chemical combination must be determined also. This is expelled by distillation, along with the hydro-carbons, and is often classed as "volatile matter."

It is true that we cannot prove the existence of this so-called combined water *as water* in the fuel. There is analogy and strong probability for supposing this to be the case, but all that we positively know is, that certain substances, such as wood, peat, and lignite, *contain combined oxygen*; and after determining the amount of this oxygen, we set apart the due proportion of hydrogen to satisfy it, presuming that this is the element combined with it. The rest of the hydrogen is considered as combined with the carbon of the volatile matter.

In the practical estimation of the value of fuels, this theoretical question makes comparatively little difference. The important point is that there is oxygen combined with a part of the fuel; or, in other words, a part of the fuel *has been burned already*, and therefore just so much has been taken from the heating power of the whole. This "combined water" must moreover be volatilized at the expense of heat obtained from the rest of the fuel.

Analyses which do not take into account the amount of oxygen in the "volatile matter" are worthless for comparisons of the heating power of fuels. They show the amount of fixed carbon, and of impurities in the ash; but in their vague category of volatile matter there lurks an unknown quantity of an incombustible of which they take no note.

Now, in this respect, as we said the other day of peat, the lignitic fuels are just where they always were. The improvements made in the preparation of peat affect the cheapness of its production, its physical purity and texture, and to some extent its hygroscopic water; but they do not touch the chemically combined oxygen. Properly prepared peat-charcoal, it is true, presents an entirely different case—and one to which we have made no allusion. It is not involved in the recent controversy on peat any more than charcoal is involved in the question of wood as a fuel.

We recommend the foregoing elementary lesson to the attention of a contemporary, which, with more zeal than knowledge, defends peat against our slanders because it is "coal in embryo." It is scarcely necessary to say that we have no quarrel with this embryonic logic. One does not carry on discussions with babes unborn. As far as our critic's enlightenment is concerned, we must patiently wait for that until his eyes are open. When that time arrives he will find the simple object-lesson we have furnished him, an excellent means of training his vision.

For our own sake, we wish to point out that our use of the term *fraudulent*, has been misrepresented. We alluded to "fraudulent comparisons between peat and bituminous coal," and this expression has been applied to the chemists who made the analyses. But it is not the *analyses*, but the *comparisons*, which are fraudulent. That same contemporary which objects to our use of the term "fraudulent" gives the following comparison.

"Here is an analysis of Old Wemyss Cannel coal under the manipulation of G. F. CUSITER, F.R.S.S.A., Laboratory Dalkeith Gas-works, Scotland.

Volatile matters,	47·13 per cent.
Fixed Carbon,	35·31 " "
Ashes,	15·40 " "
Sulphur,	·84 " "
Water,	1·32 " "
	100·00

The sample of peat taken from Mr. A. KENNEDY'S bog at White Plains, Westchester Co., and analyzed by FRANCIS E. ENGELHARDT, Ph. D., St. Francis Xavier College, New York City, gave

Bituminous matter,	48.59 per cent.
Carbon,	39·50 " "
Ashes,	11.83 " "
	99·92

We are unable to see that this comparison is anything but fraudulent, unless the writer chooses to confess ignorance. That peat always contains water may be proved from every book on the subject we have ever seen, and we dare to say that no respectable writer has claimed to know of a peat which is free from water. The amount is usually given at 10 to 30 per cent., and yet we have here an analysis of coal in which 1½ per cent. of water is mentioned, while the 10, 20, or 30 per cent., which the peat must have contained, is entirely suppressed. We suppose the peat analysis is a theoretical one, the proportions of carbon, ash, and volatile matters having been calculated after deducting the water. This is a common proceeding of chemists who wish to show the relative proportion of the elements in fuel.

The name *peat-substance* has been given to that compound of carbon, hydrogen and oxygen, which remains when both the moisture and the ash have been eliminated; and SCHEERER puts the average composition of this substance at c 60·63, h 6·04, and o 33·32, or c 60·63 free, h 2, and chemically combined water 38. But we are not dealing with the mythical peat substance, and to compare a theoretical analysis with one that is real, is certainly anything but just.

Again, as to the "bituminous matter." According to the commonly received analyses of fuels—those, for instance, given in Prof. EGLESTON's Metallurgical Tables, and which may be found in many standard works—peat contains, on an average, about 33·4 per cent. of oxygen, the Ten Yard Coal of Staffordshire 16·6 per cent., and Pennsylvania anthracite 1·7 per cent. There is, therefore, the greatest difference in the composition of the "volatile matters" of peat and of coal. But in this comparison there is no hint of this difference. The "bituminous matter" of peat is checked off against the "volatile matters" of coal, as if they were of equal value. Indeed, if there is anything in nomenclature, the peat is made to appear the more valuable. In fact, the author of that comparison, in placing the analysis of one class of fuel side by side with that of another and entirely different class of fuel, must have misled those of his readers who are uninformed on the subject, and can only have aroused the suspicions of those who do understand it.

Intermittent Iron Furnaces.

A New York gentleman has lately been looking into the subject of banking up iron furnaces on Sunday, and thus giving furnacemen, in common with other workmen, the benefit of that holiday. His inquiries among iron workers have proved that a good deal of interest is felt in the subject, and most of those to whom he has applied, think that solid advantages would accrue from stopping work on Sunday, if it can be done. But as to that *if*, a majority of them are of opinion that banking up for 24 or even for 12 hours would be disastrous to the regular working of the furnace. Many reply that they have made experiments to ascertain whether a Sunday rest is possible, and with unfavorable results. We will give the following extract from a letter, written by a well known manager in the Lehigh region as a sample of the view taken by a majority of those iron masters who have been written to.

"I will simply say, that several years ago we experimented here, with the earnest desire to accomplish this purpose, but could not succeed. We found that the furnaces, in several instances, would not recover from the stop from one Sunday to the next. We lost quantity and quality of product to such an extent that it had to be abandoned. We then tried to stop the furnaces from about 8 A. M. until the middle of the afternoon. This did better, but it was only a question of time; the result came—*i. e.* bad-working furnaces, so that finally the whole thing had to be given up.

"I hope the day may come when this very desirable end may be reached, but I do not know of any method of working at present that will admit of it."

On the other side of the question is the undeniable fact that there are furnaces which lie over on Sunday. Many of the charcoal furnaces do so, but leaving these out of the question as too small to serve as proof of what may be done in larger furnaces, there is at least one other, the Ashland, on the Ohio River, in Kentucky. This is 62 feet high, 15 feet bosh, and runs about forty tons a day. The *Iron Age* gives a letter from Mr. Douglas Putnam, the manager, in which he says:

"This furnace has made stopping on Sunday the rule—running, the exception—since its 'blow in' three years ago last August, excepting a few months during the summer of 1870, when the hearth was very thin and worn. I am of the opinion that a stoppage of twelve hours, or during daylight, is not only of no detriment, but is rather an advantage, *giving an opportunity of examining all machinery*, and with the men rested for the next week's work. We simply stop; make no change in burden, or anything else. The average production of the furnace per day is 47 tons; size, 15x62 Stock used yields about 50 to 55 per cent. During the time we did not stop, the furnace worked no better, used no less stock, and averaged no more iron than when we stopped as usual."

This question is one of great interest. That the day's rest would be a benefit to the workmen, we will consider as granted, and the effect of the loss of one day's make upon the producer's profits, may also be left out of the discussion. The real point in dispute is whether one day's stop will not cause irregularities for several succeeding days. The impression of furnace managers generally is that it will give rise to such irregularities as must effectually dispose of all efforts to cease working, periodically, for a day; and the object of bringing forward the subject now is to request those managers who know of any experiments made with this object in view, to communicate the results, the points especially desired being the change which actually takes place in the quantity and quality of the product. The letters which have been received by the gentleman who is investigating the subject, prove that many interesting experiments in this direction have been made, and the publication of their details could not fail to be valuable. One of the gentlemen connected with the Ashland furnace, thinks that furnaces can be built to lie over Sunday, but does not think that all those at present constructed are suitable for that mode of working; but he does not discuss the changes that would be necessary to fit a furnace for lying over without hazard. If improved modes of construction can reduce the risk in stopping, we think furnace managers generally will be glad to know what they are, whatever may be the result upon the Sunday question.

NEW PUBLICATIONS.

THE Mine Ventilation Law with the opinion of Attorney-General BREWSTER and the decisions of Judge HARDING in regard to second openings and second lifts. Also the decision of Judge DANA relative to the ventilation of mines. Wilkesbarre, Pa., MORTON & TAYLOR, printers, 50 cents.

This pamphlet is a republication by the Wilkesbarre Coal and Iron Company, of the above-mentioned law and decisions. These decisions have been copied from the public prints and may contain some minor typographical errors, but otherwise they represent the state of the law and practice as they now stand. The introduction is so good a summing up of the points covered by the judicial decisions that we copy it herewith. We commend the pamphlet to our readers as the readiest means of obtaining the latest information on this important subject.

In Bonnell's case, the matters decided by Judge Harding, are practically as follows:

1. The Act of 3d of March, 1870, commonly known as the "Mine Ventilation Law," is constitutional.

2. Any mine having but a single shaft or slope, but being in communication with a second outlet, and thus having a safe and convenient means of ingress and egress for the persons employed therein, though the same be in connection with another mine; and having, also, the other requisites for safety named in the Act, may be operated to its full capacity, and coal may be cut therein, and prepared, and sent to market as freely and fully as though the Act had not been passed.

3. Without a second outlet, however, and without the additional requisites for safety as prescribed by the Act, no shaft or slope can be operated at all; and it is the duty of the Mine Inspector, whenever a case of the kind comes under his observation, to apply to the Court and have it closed up at once.

4. Where no second outlet exists, and a tunnel or a shaft is required as an additional opening, the Act makes permissive the driving of the same with such force as the Mine Inspector shall direct; but when such additional opening is sought to be reached *through coal*, then not more than twenty persons shall be employed at any one time therein, and their working must be *exclusively* towards a second outlet. Cutting coal for market by a portion of them, and driving for a second outlet with the others, is not within the provision of the Act.

5. When, large quantities of coal are thus cut in driving for a second outlet, it may be hoisted out of the mine by the over-erected machinery, and thus got out of the way of the workmen, and being then ready for market, of course, it may be sold by the operator; but if it requires further preparation, such as cracking, screening and the like, the use of the machinery for this purpose seems not to be contemplated by the terms of the Act. The working of the colliery, except it be solely for a "second opening through coal," is prohibited absolutely and unconditionally.

6. And where a mine has been operated by a single shaft or slope for a series of years, and at the bottom a *stratum* of coal has been exhausted to such an extent as to afford ample stocking ground for coal cut in working for a second outlet, thus obviating the necessity of hoisting it to make room for the workmen, such stocking ground must be used until the second outlet is completed. Hoisting of coal thus cut, even though it would be more convenient and less expensive to the operator, is under the Legislative ban, and will not be permitted.

7. All the provisions of the Act in their full rigor, as understood by the Court, will be enforced as well against the Mine Inspectors, as against the owners, occupiers and lessees of coal mines.

In the case against the Wilkesbarre and Seneca Lake Coal Company, involving the question of "Second Lifts," Judge Harding's ruling established the proposition about as follows:

1. Where in connection with a colliery, a shaft or slope has been driven into a *stratum* of coal, which is in communication with a second outlet at the point where the mining is carried on, but from that point, if the shaft or slope be continued following the pitch of the *stratum* down several hundred feet further, and at the bottom extensive mining be carried on, and there is no second outlet communicating therewith, separated by natural *strata* of at least one hundred and fifty feet in breadth, such mine or colliery is within the Legislative inhibition; and an injunction will be granted to restrain the owners, lessees, or occupiers thereof from thus working the same.

Tompkins' case, decided by Judge DANA, elicited the following ruling:

1. The defendant's mine, at the point where the workings are going on, is free from standing gas; but these workings connect with, and open into old, abandoned workings, where standing gas accumulates, flows, and by frequent falling of the roof, is liable to be driven into the defendant's workings, to affect the air and to cause destructive explosions: *Held*, That, under these circumstances and thus connected, "the entire mine is not free from danger to the lives and health of the men," nor in a fit state for them to work therein, as required by the Ventilation Act, and an injunction was awarded.

2. A mine is not free from danger, when it actually exists within the mine, simply because the danger originates in causes located a few feet or yards beyond and outside of the boundary lines. The Act deals with its presence, not its origin.

3. The Act does not require that a mine be kept absolutely clear of gas, for this is impossible; but as fast as evolved, it is, by the introduction of pure air and the process of ventilation, "diluted, rendered harmless and expelled," and its accumulation as, and so as to fall within the designation of "standing gas," avoided.

CORRESPONDENCE.

Mining Tunnel Rights.

TO THE EDITOR: The tunnel section in the Act of Congress, approved May 10th, 1872, has generally been condemned by mining authorities. The Hon. WILLIS DRUMMOND, Commissioner of the General Land Office, has recently given a new interpretation to this section, which, if sound, makes it plain that Congress perpetrated a grand practical joke when it passed a law with such a mystical provision in it. The section reads thus: "That where a tunnel is run for the development of a vein, or lode, or for the discovery of mines, the owners of such tunnel shall have the right of possession of all veins or lodes within three thousand feet from the face of such tunnel on the line thereof, not previously known to exist, discovered in such tunnel to the same extent as if discovered from the surface; and locations on the line of such tunnel of veins or lodes not appearing on the surface made by other parties after the commencement of the tunnel, and while the same is being prosecuted with reasonable diligence, shall be invalid; but failure to prosecute the work on the tunnel for six months shall be considered as an abandonment of the right to all undiscovered veins on the line of said tunnel."

Amongst men of moderate intelligence, more or less connected with mining business, I have never heard of anything but one meaning being attached to the above section: that it conferred on the locators of a tunnel the exclusive right to prospect a tract of mineral land 3,000 feet long by 1,500 feet wide. The section unquestionably gives a forfeitable right to all previously undiscovered veins; and, as another part of the Act names 1,500 feet as the

maximum to be claimed on each lode, it follows that this is the extent of the right. If this is not its meaning, the law certainly cannot be of any practical value to the miner.

To render an injudicious enactment as harmless as possible, Mr. DRUMMOND appears desirous of curtailing the privileges it bestows. In a letter addressed to a gentleman in Colorado, he says: "The line of the tunnel is held to be the width thereof, and no more, and that upon this line only is prospecting for blind lodes prohibited while the tunnel is in progress, and that the right is granted to the tunnel owners to fifteen hundred feet of each blind lode not previously known to exist, which may be discovered in such tunnel, but that other parties are in no way debarred from prospecting for blind lodes or running tunnels so long as they keep without the line of the tunnel as herein defined."

According to this decision, the entire right acquired by locators, under the tunnel section of the Act, is the privilege of prospecting a strip of land 3,000 feet long and about four feet wide, such being usually the width of an ordinary tunnel. This line, too, must be accurately marked off on the surface, and if the tunnel bends either to the one side or the other, it may get outside of the legal limits, and so be an illegal and wholly unauthorised undertaking. If our sapient legislators intended seriously to give the mining community such a humbug of a law as this, why did they not put their meaning in plain words, that could only have one interpretation—such as: "The locators of a tunnel shall have the exclusive right of possession of four feet on each run or lode discovered in such tunnel within three thousand feet from the face thereof, and if no other parties have found said lodes or veins before them, then, in that event, they will be allowed to locate fifteen hundred feet on each. But it is expressly provided that if a miner employed in said tunnel ascertains by indications in the rock that a lode is likely to be struck within a short distance, he shall be entitled to go on the surface at the point where he believes said lode will probably crop out, and if he first discovers it, either by means of an open-cut or a short piratical tunnel, he may, by keeping five feet off the line of the prior tunnel, secure to himself fifteen hundred feet on said lode; but if he claims his ground on each side of the original tunnel line, the owners thereof shall have the right to hold four feet thereon to an indefinite depth in following the vein."

This is just what Mr. DRUMMOND'S recent ruling reduces the tunnel section to; and if judges, juries and attorneys would only be pleased to turn it into burlesque like this, we might speedily get rid of a most objectionable law. These gentlemen, however, are often hard-headed and conceited enough to believe they understand the meaning of plain English, and hence I fear there will be many a law suit before they consent to a proper construction being put on the section alluded to.

It has always been conceded by mining law and custom that parties opening ground by a tunnel, had an exclusive right thereto; and Congress therefore did not require to pass a law conferring a right which labor could at any time secure. I hope the tunnel section in the recent act will be repealed at the next session of Congress; but, as long as it is in force, the rights it seems to confer will be keenly fought for in the local courts.

Even the "Regulations," issued on June 10th by the General Land Office, will be used to prove that at that time the Commissioner attached a different meaning to the tunnel section from that which he now propounds. "This office will take particular care," say these regulations, "that no improper advantage is taken of this provision of the law by parties making, or professing to make, tunnel locations, ostensibly for the purposes named in the statute, but really for the purpose of monopolising the lands lying in front of their tunnels, to the detriment of the mining interests, and to the exclusion of *bona fide* proprietors or miners."

If four feet on each lode is all that the law really confers, surely it cannot be said that the giving of this would amount to a monopoly requiring to be guarded against in protecting the interests of surface proprietors.

The tunnel owners are the men most in need of protection, if four feet is the width of their claim; for, by carefully watching developments in the tunnel, unscrupulous prospectors or miners might actually steal the very lode the tunnel owners hoped to find. Hence, to such prospectors the tunnel could work no detriment, but quite the reverse. It will be quite interesting to know in the future whether the tunnel law has not even more than two meanings that may be justly attached to it, and if so, it will also be of interest to ascertain who the modern Talleyrand was that prepared it for submission to Congress. JOHN DARE EMERSLEY.

Eureka, Nevada, Nov. 8, 1872.

American Institute of Mining Engineers.

OFFICIAL BULLETIN.

Announcements to Members and Associates.

I. The dues for the year ending May, 1873, are now payable. All members and Associates who have not paid their dues are requested to do so at once, by sending in postal orders, or checks, or money, ten dollars to the Secretary.

All members and Associates who pay their dues for each current year, strictly in advance, will have sent to their address, regularly and weekly, the ENGINEERING AND MINING JOURNAL, which is the organ of the Institute, and will contain the proceedings and transactions, and all important papers read before the Institute and all notices of meetings. Back numbers cannot, as a general rule, be sent.

II. It is expected that the more important papers read before the Institute, and the debates thereon, will be published in annual or occasional volumes to which those Members and Associates will be entitled who have paid their dues.

III. All authors of papers are requested to notify the Secretary in advance of the meetings, giving the subject and length of their papers. Attention is also called, in this connection, to Rules 12 and 13.

IV. The ninth rule has been amended, so that there will be hereafter three meetings a year, in February, May and October.

Wilkesbarre, Pa. MARTIN CORYELL, Secretary.

MINING SUMMARY.

Utah.

CAMP FLOYD SILVER MINING COMPANY, LIMITED.

We take from our foreign exchanges the following facts in regard to the condition of this company. They were brought forward at an extraordinary meeting of the shareholders.

The Chairman said: Gentlemen, as we are mostly men of business, and time is of value to us all, I propose that the business which has called us together to-day be immediately proceeded with. There is no notice of the meeting to be read, inasmuch as this meeting is one to which we have deemed it expedient to invite you to meet Capt. Shaw, and to hear from him an account of his stewardship; for, as you are all probably aware, he has had the management of the company's mines ever since their inauguration. Such being the case, and having arrived in this country, we thought it a good opportunity to invite you to meet him, in order that you might hear what he has done, and what our prospects are, and the state of our works generally. The directors have little to say, except that since the mines have commenced working we have opened up a course of ore—according to the statements we have received from the mines—of 450 feet in length; there have been incline shafts sunk, one to the depth of 205 feet, one to the depth of 181 feet, and one to the depth of 54 feet. Those three shafts are separated by a distance of 290 feet, and in the bottom of each of these shafts, the board are informed, by the last account received from the mines, that there is rich ore being extracted. I may also state that the mill commenced working—or in other words, the company commenced business operations about three months ago and we have been informed as to the result of that three months' working. The net profit made during that period amounted to 4,700*l.*—that is to say, after charging all costs against the gross returns, there has been realized a profit during the three months of 4,700*l.* (cheers). And which sum would enable the company—if such a policy were deemed advisable—to have given you a dividend, on the three months' working, of about 7*s.* 6*d.* per share, and to have carried forward a balance of 300*l.* I think those would be about the exact figures. There have been—so we learn by the September statements of account just received—run through the mill in that month 19 tons of ore daily, on an average yield of about $17 to the ton. As it is well known to many of you, the whole of the silver cannot be extracted by this process that is given you by assay, but you may estimate that the net result is about $42 to the ton. And taking the cost of milling, which, according to the last returns, is only $9½ per ton, and the whole cost of working the ore, there is left a net profit for the month of September, of 1,935*l.*—a trifle under 2,000*l.*, and something less than at the rate of 24,000*l.* a year, and which would give you something like 20 per cent. upon your capital (cheers) In respect to the statement I made that there are trial shafts being sunk, I think it is well that I should explain the matter to you, in order that you may not be under any misapprehension when reading the reports from the mines. Our manager is sinking three shafts in the rock, to take the lode at a greater depth than by our present workings, and when he says there is nothing at the bottom such a statement may surprise the uninitiated, while, of course, miners would not expect to meet any ore until the lode has been intersected. The lode is at present being worked in the incline shafts, the depths of which I have told you. Those shafts are separated by a distance of 290 feet, and at the bottom of these workings the lode is as I have told you, being worked at the present moment. And now, gentlemen, having briefly informed you as to the past operation and present position of the company, I shall be happy to call on Capt. Shaw to address you.

Capt. E. D. Shaw, after a few prefatory remarks said:

As to the position of affairs on your property I may say that the last time I was at the mines, that was the day before my accident, we were taking out ore from the bottom of each incline; and the further we have gone into the hill the better it looks for a permanent lode. Now, I may be somewhat in fault for having raised your ideas too high as to the amount of ore your mill was anticipated would work, because the result of its working does not come up to the expectations held out. I expected that we should be able to mill about 30 tons of ore per diem, whereas, instead of that, we are milling only 19 tons per day. This falling off from what we anticipated is to be accounted for by the hard character of the ore we treat.

Mr. Bennett asked as to the process of reduction.

Capt. Shaw said it was done by crushing the ore, and amalgamating it by the help of quicksilver. There existed a little antimony in the ore. Some portion of the quicksilver was recovered, and used again; the loss amounted to about 2½lb. of quicksilver to the ton of ore. As to the proportion of silver to the ton, the produce at present being raised from the mines was yielding about 47 dols. of silver to the ton of ore. The cost of milling had been reduced in September to $9.45 per ton; whereas, during the first month of the company's operations, the cost of milling amounted to $15 per ton. It was impossible to calculate the mining expenses, on account of the cost (which must be included) of their exploratory works. The only ore at present being extracted was that taken out in sinking those inclines.

Mr. Bennett observed that in stamping the ore, the management had found that it was difficult of treatment, more so than they expected.

Capt. Shaw said such was the case. The ore was very hard, and that was the reason they had not been able to mill they quantity they had originally anticipated. There was so much lime mixed up with the ore that it got clammy and clogged the screens.

Mr. Bennett asked if he had altered the size of the meshes.

Captain Shaw replied that he had commenced with size 50, but had subsequently decreased the size to 35. As to the process of reduction, he stated that after the ore was crushed it was taken to the amalgamating pans and amalgamated; it was during that stage that it was treated with quicksilver. As to the nature of the ground, it was limestone and quartz mixed.

Mr. Scott, in the course of some very lengthened re-

marks, drew the attention of the meeting to one or two points in respect to which he considered the management in Utah had been wanting in many respects.

In regard to the returns of ore, there existed a great discrepancy between Captain Shaw's promises and the fulfilment of them. In May the shareholders had been told by their superintendent that the returns would amount to 6,000*l.* per month, or equal to 60 per cent. upon the capital. And a little later, and when the mill had begun working, and was turning out, instead of 30 tons a day, as was expected, only 18 tons, the shareholders had beed informed by telegrams from Capt. Shaw that it was working well. Now, how could that be called working well, when there had been so great a falling-off in the quantity estimated to be treated? The same remark would apply to the circumstances with the average yield of ore. They had been told that the average yield of $41 per ton would be much increased in the month of August, and yet that time had arrived, and passed, and they saw no increase whatever. All those matters were of an unsatisfactory character, and he felt, required an explanation from Captain Shaw. Then, in regard to the stoppage of the mill, a most important point, and upon which the shareholders had not been informed at as early a date as they should have been. The mill had been stopped working about the middle of October, and they were not aware of the fact until the 29th of the month. He considered that the directors should certainly make the strictest enquiries into the cause of this delay. And this being the case, he questioned their prospects for the future. In consequence of that accident the returns for October would be only 1,800*l.*, and he did not expect that the mill would resume working until the middle of the present month; they could not, therefore, look for any profit being realized in either of the two months. And what were they to understand as to the mention made by Mr. Hussey in his last telegram of a fall of snow. They had been told that the snow could not impede their operations. Now, was that word "snow" introduced for the purpose of intimating to them that hereafter the snow would probably interfere with the working of their mines? He could not understand it being done for any other purpose, and yet they were told that the snow could not possibly interfere with them, from the fact that the Company's property was situated on the slope of a hill.

Captain Shaw said: That when he had left this country last October, he had told the directors of the company that he had so much faith in the property, that he would give them his services in any way they desired, and would work for them until the mill was completed. At that time they had expected to have had the mill completed long before it was. He had had to go to San Francisco to order the machinery, that had taken a long time on account of the foundries being full of work. And then when the machinery had been sent off for transmission to the mines, the roads were so bad that continual delays arose on that account. Some portion of the machinery had been actually five weeks upon the road between Sandy station and the mines. During the last season they had to contend with one of the most severe winters ever known in this country. Then after they had got the mill pretty well advanced, it had been deemed necessary to erect a roasting furnace, to calcine the ore before amalgamating. He had not thought this necessary, but other members of the management had. They could not buy bricks for this furnace, and they were prevented by the frost from making them, until the weather changed. Owing to those circumstances, it had been towards the end of May before they had commenced erecting the mill. It would have been erected six weeks earlier had it not been for the necessity of that furnace. Such were all the excuses he had to offer as to the delay in the erection of the mill. As to the yield of silver per ton of ore, he thought that when he had sold the property he had represented that the ore would average about $45 per ton. Now, after further development of the mines they had struck some very rich streaks of ore, of which many assays had been made, and in some cases it had gone up as high as $125 per ton. A large body of this ore had been accumulated on account of the detention of the mill, and from samples taken it gave a value varying from $60 to $125 per ton; but when they came to put it through the mill they had not come up to their expectations, which he could not regard as over sanguine or unwarranted. As to the danger apprehended on account of snow, he said that it could never interfere with the mining operations. He assumed that Mr. Hussey had alluded to a fall of snow for the reason that it was now probable the stream would run again and that they would have a plentiful supply of water. He did not think they need entertain any fear of being in want of water for the immediate future. The occurrence of a drought might be remedied by sinking tanks. The source of the company's supply was from a stream about 1,400 feet above their mill. The company owned the sole right to this water.

When he was last on the mines they were looking better than ever; they were down at a greater depth, and they had certainly a larger amount of reserves in sight, something like 4,000 to 5,000 tons. And he should estimate that there was about 2,200 tons of ore on dump.

LITTLE COTTONWOOD.

Correspondence of the Salt Lake *Tribune* of Nov. 16.

Alta City November 7th, 1872.

The Davenport mine is situated on the crest of the divide, or ridge, which separates Little Cottonwood Canyon from Big Cottonwood, and about one mile northeast of this city. The mine proper consists of 1,200 lineal feet, and was incorporated in England witw A. H. Philpotts as President of the company. This incorporation represents a capital stock of $600,000, which is partly owned by English capitalists and partly by American. I find from observation that there is a perpendicular shaft sunk to the depth of twenty-three feet from the surface, and thence, from the bottom of this shaft, is run an incline shaft, following the vein, a distance of 186 feet. From the bottom of the incline is sunk another perpendicular shaft forty-five feet, making the whole distance run 254 feet. The average thickness of the vein appears to be four and a half to five feet, and the character of ore is argentiferous (highly metaliferous) carbonates, and oxides of lead. I learn from the superintendent, Mr. W. B. Smith, that the pulp assays, on general average, show $132 in silver to the ton, and 27 per cent. lead. I am also informed that there has been about 10,000 tons of ore shipped from the mine; there has been none taken out during the past summer. The tunnel, which was started from the Little Cottonwood side of the mountain early last spring, is now in a distance of 426 feet, and the superintendent seems to be confident that the ledge will be struck in running twenty feet further. Another mine, situated to the south of the Davenport, and one which, I learn, will come under the control of that company, is the

MATILDA MINE.

I was shown through this mine by W. B. Smith, who is likewise superintendent, and find that there is a perpendicular shaft sunk to the depth of seventy-five feet. At the bottom of the shaft there are two lodes run, following the vein or deposit, one of them a distance of forty-five feet southerly and the other northerly fifty feet. The ore body appears to be immense in this mine, varying in thickness from ten to sixteen feet, the character of which is about the same as that taken from the Davenport mine. The casing walls appear to be well formed, and from general appearances I am inclined to the belief that an ore connection will be traced to the Davenport. At no distant day I understand there will be a tunnel run from this mine to connect with the Davenport tunnel, through which the ore from both mines will pass, and thence over their tramway to Grizzly Flat. At present there are twenty men at work in and about this mine, and the daily yield of ore is about seven tons, which is being shipped to the company's furnace at the mouth of the canyon.

THE EMMA MINE,

I learn from the superintendent, Mr. Williams, is turning out from 450 to 480 tons per week shipping ore. I was shown through the mine yesterday by Mr. Williams, at least as far through it as anyone can go without a permit from proper authority, and find that the impression entertained regarding the carelessness of the managers in timbering is erroneous. The mine, so far as my observations went, is well timbered, and I don't think that there is any just cause for complaint against the Superintendent. The man's name that was killed a few days ago, in this mine, was Richard Tyack, instead of Dyke, as reported.

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This company owns, and is now driving as vigorously as possible, the Bay City tunnel, the mouth of which is situated 400 yards North of this city; also the Pacific, the mouth of which is situated half a mile northwest of Alta and near the trail leading to the Frederick mine. The first named of these tunnels is now in a distance of sixty-eight feet, and the last, the Pacific, is in sixty-four feet. Both of these tunnels are under the superintendency of Mr. Edward Carruthers, a practical miner, as the timbering in the tunnel will fully attest. The Bay City is pointed for or near the Montezuma mine on Emma mountain, and will, if run 3,000 feet, strike about 1,500 feet below the surface. The Pacific is pointed for a point a little West of Flagstaff, and if run to the North end of the location, will strike from ten to twelve hundred feet below the surface. I understand from Mr. Carruthers that it is the intention of the company to push work as rapidly as possible during the coming winter.

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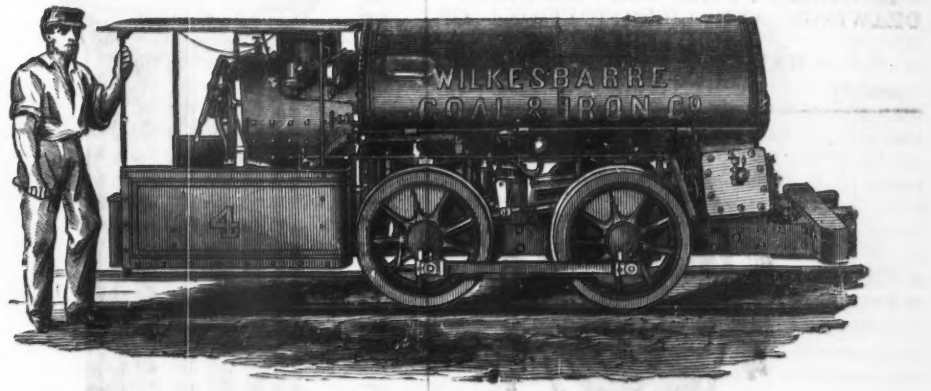

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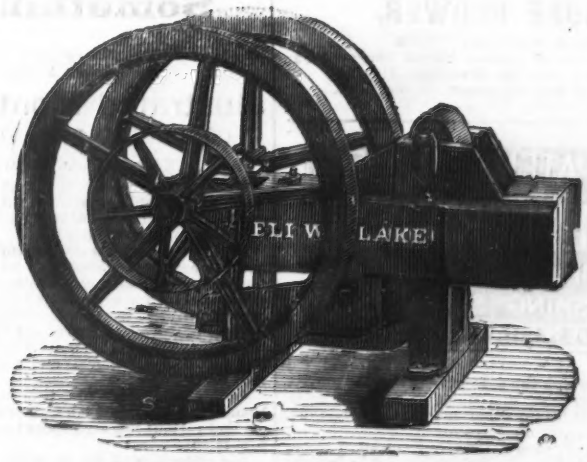

The office of this Machine is to break Ores and Minerals of every kind into small fragments, preparatory to their further comminution by other machinery.

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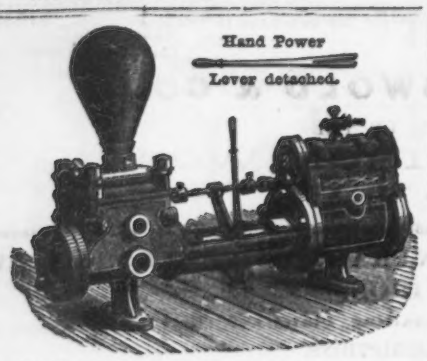

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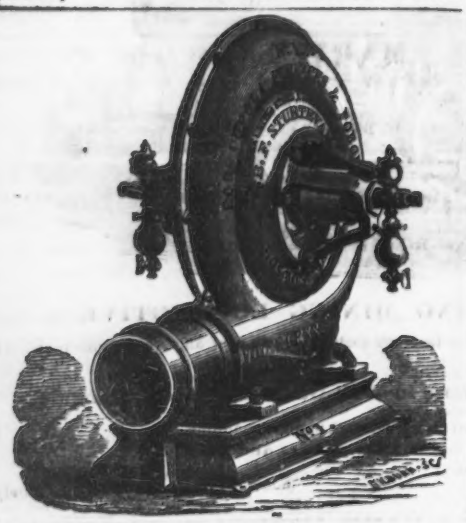

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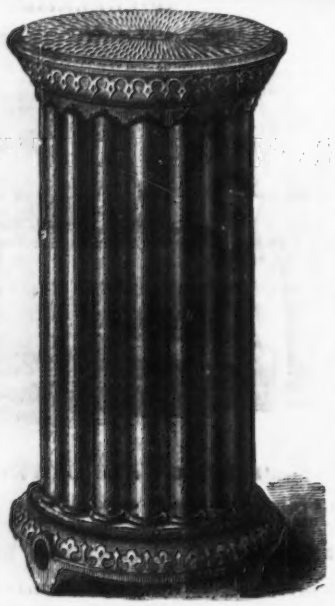

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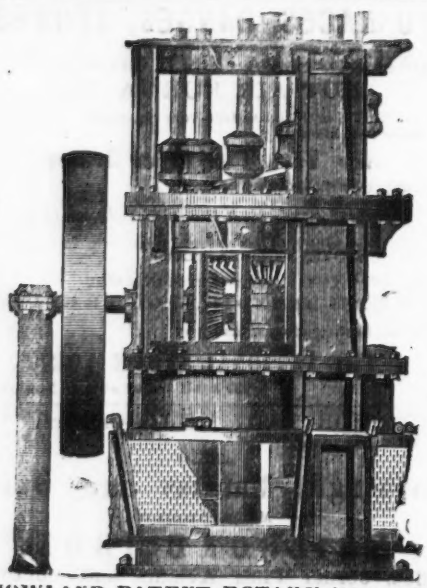

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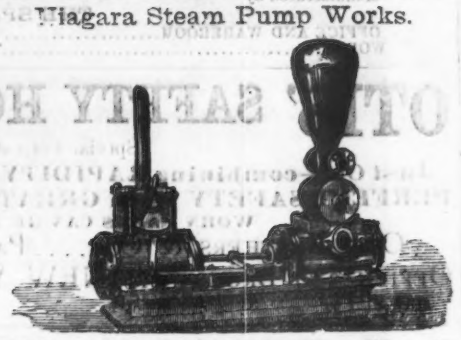

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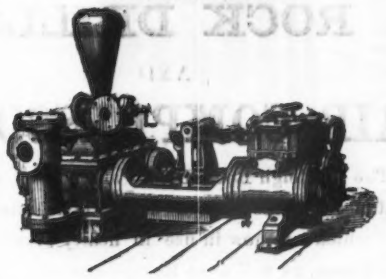

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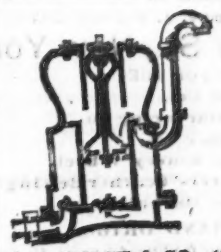

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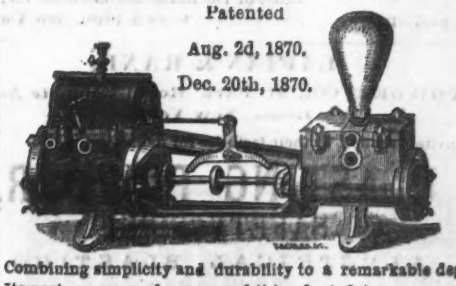

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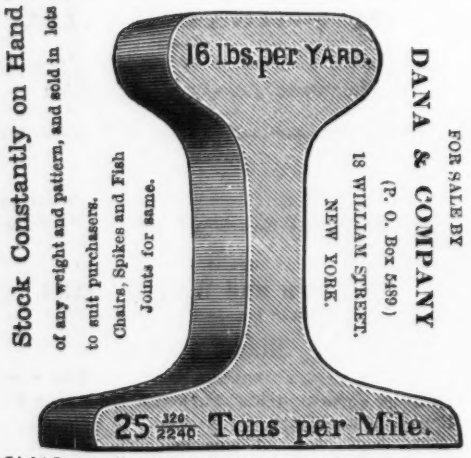

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29, 31, 33 Park Place,
Oct. 29:3m NEW YORK.

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Portable and Stationary. "The Best Cheapest, most Durable." Improved Circular Saw Mills, Screw and Lever Set. Send for Circular.
UTICA STEAM ENGINE CO., UTICA, N. Y.
G. G. YOUNG, General Agent,
Nov. 12:6mos 42 Cortlandt Street, New York.

WANTED.

A MINING SUPERINTENDENT for Magnetic Ore Mines in New Jersey. Must be a reliable and experienced man. Address, giving salary expected and some statement of previous experience, C., care of this office.
Nov. 26:2t